AGS PUBLISHING

Basic Math Skills

Student Workbook

Name Date Period

Workbook Activity
Chapter 1, Lesson 1
1

Place Value

EXAMPLE Look at the place of the underlined digit.
Write the name of the place of the underlined digit. 1<u>9</u>8 tens

Directions Write the name of the place for each underlined digit.

1. 2,4<u>0</u>6 _____
2. 12<u>8</u> _____
3. 70,<u>8</u>35 _____
4. 17,<u>5</u>01 _____
5. 301,33<u>9</u> _____
6. 10,0<u>0</u>2 _____
7. 49<u>1</u>,918 _____
8. 4<u>6</u>,023 _____
9. <u>6</u>,005 _____
10. 59,<u>7</u>00 _____
11. <u>3</u>4,000 _____
12. 50<u>0</u>,069 _____
13. <u>3</u>41 _____
14. 1<u>0</u>,000 _____
15. 1,<u>0</u>00,000 _____
16. 3,<u>9</u>02,885 _____
17. <u>5</u>03 _____
18. 16,<u>0</u>30 _____
19. <u>2</u>,000,003 _____
20. 73,9<u>9</u>9 _____

21. 29<u>4</u> _____
22. 5,<u>0</u>20,007 _____
23. 9<u>1</u>9,078 _____
24. 4,<u>0</u>09 _____
25. 5,6<u>8</u>3 _____
26. 687,6<u>3</u>3 _____
27. 48,04<u>0</u> _____
28. 384,9<u>9</u>5 _____
29. 8,<u>8</u>37 _____
30. 23,0<u>0</u>0,821 _____
31. <u>1</u>,010,001 _____
32. 5<u>3</u> _____
33. 5,0<u>7</u>8 _____
34. <u>7</u>08,583 _____
35. 61,2<u>2</u>2 _____
36. <u>7</u>01,865 _____
37. 70,7<u>3</u>8 _____
38. 5<u>0</u>1,775 _____
39. 102,8<u>9</u>5 _____
40. 71,99<u>0</u> _____

41. 88,2<u>1</u>0 _____
42. 9<u>0</u>,909 _____
43. <u>2</u>03,872,221 _____
44. <u>9</u>10,573 _____
45. 10,7<u>1</u>0 _____
46. 7<u>3</u>7,098 _____
47. <u>4</u>0,910 _____
48. 10,0<u>0</u>2 _____
49. <u>9</u>,033,921 _____
50. 8<u>1</u>0,022,033 _____
51. 3<u>0</u>0,941 _____
52. 2,<u>6</u>71 _____
53. 94,<u>7</u>24 _____
54. <u>8</u>03,921 _____
55. <u>5</u>06 _____
56. 1,<u>0</u>34 _____
57. 92<u>0</u> _____
58. 1,0<u>2</u>3 _____
59. 46<u>2</u>,987 _____
60. 10,<u>9</u>35 _____

Writing Numbers

EXAMPLE Read the numeral. Write the numeral in words.

1,241 one thousand, two hundred forty-one

Directions Write the following numerals in words.

1. 1,208 _____

2. 204 _____

3. 4,801 _____

4. 80,026 _____

5. 92,224 _____

6. 44,659 _____

7. 602,875 _____

8. 6,096,089 _____

9. 673,218,003 _____

10. 830,002 _____

Number Translations

EXAMPLE Read the amount written in words. Write the numeral for the amount.

Four thousand, one hundred ninety-two 4,192

Directions Write the following amounts in numerals.

1. Three thousand, five hundred thirty-six _____
2. Five hundred six _____
3. Seven hundred forty-nine _____
4. Five thousand, nine _____
5. Seven thousand, three hundred twenty-one _____
6. Nine thousand, two _____
7. Nine thousand, five hundred _____
8. Thirty-one thousand, four _____
9. Fifty-seven thousand, nine hundred _____
10. Eighty thousand, six hundred thirty-two _____
11. Forty-two thousand, three _____
12. Ninety-one thousand, four hundred eleven _____
13. Seven hundred thousand _____
14. Nine hundred thousand, sixty-four _____
15. Seven hundred seventy-one thousand, five hundred forty-nine _____
16. Four hundred fifty-five million _____
17. Three hundred five million, twenty-eight thousand, two _____
18. Eight thousand, eleven _____
19. Three hundred sixty-three thousand, five hundred four _____
20. Seventy thousand, nine hundred forty-two _____

Name Date Period

Workbook Activity
Chapter 1, Lesson 2
4

Rounding Whole Numbers

EXAMPLE Read the number. Round the number to the nearest tens place. Round numbers 5–9 up. Round numbers 1–4 down.

26 = 30

Directions Round these numbers to the nearest tens place.

1. 48 = _____
2. 305 = _____
3. 4,056 = _____
4. 408 = _____
5. 9,911 = _____
6. 72,099 = _____
7. 5 = _____
8. 803 = _____
9. 617 = _____
10. 61,092 = _____
11. 777 = _____
12. 290 = _____
13. 4 = _____
14. 18 = _____
15. 102,005 = _____
16. 4,506 = _____
17. 9 = _____
18. 61 = _____

Directions Round these numbers to the nearest hundreds place.

19. 693 = _____
20. 349 = _____
21. 9,012 = _____
22. 7,521 = _____
23. 43,071 = _____
24. 102,009 = _____
25. 29 = _____
26. 3,002,091 = _____
27. 71 = _____
28. 91,029 = _____
29. 6,018 = _____
30. 33,951 = _____
31. 34,988 = _____
32. 89 = _____
33. 129,999 = _____
34. 10,891 = _____
35. 509 = _____
36. 780 = _____

Directions Round these numbers to the nearest thousands place.

37. 199 = _____
38. 499 = _____
39. 1,500 = _____
40. 25,509 = _____
41. 999 = _____
42. 90,098 = _____
43. 1,058 = _____
44. 501 = _____
45. 99 = _____
46. 301 = _____
47. 298 = _____
48. 78,475 = _____
49. 470,512 = _____
50. 19,000 = _____

Addition of Whole Numbers

EXAMPLE Write the problem in vertical form. Add.

18 + 162 + 171 + 8 = 359

$$\begin{array}{r} {\scriptstyle 1\,1} \\ 18 \\ 162 \\ 171 \\ +\ \ 8 \\ \hline 359 \end{array}$$

Directions Rewrite the following addends in the vertical form and add.

1. 32 + 141 + 68 + 122 = _____

2. 4 + 37 + 812 + 774 + 1 = _____

3. 8 + 35 + 77 + 273 + 65 = _____

4. 54 + 76 + 90 + 725 = _____

5. 701 + 33 + 83 + 61 + 374 = _____

6. 7 + 837 + 504 + 91 + 522 = _____

7. 93 + 705 + 866 + 73 = _____

8. 45 + 38 + 401 + 5,000 = _____

9. 86 + 59 + 63 + 27 + 105 = _____

10. 395 + 57 + 82 + 273 + 88 = _____

11. 304 + 771 + 826 + 776 = _____

12. 366 + 8,261 + 8,837 + 912 = _____

13. 6,372 + 75 + 908 + 76 = _____

14. 874 + 7,601 +406 + 837 = _____

15. 7,091 + 5,308 + 354 + 34 = _____

16. 645 + 823 + 806 + 7,735 = _____

17. 6,657 + 4,321 + 7,341 = _____

18. 905 + 624 + 861 + 968 = _____

19. 6,241 + 8,548 + 9,092 = _____

20. 558 + 523 + 128 + 8,241 = _____

21. 264 + 63 + 7,253 + 2 = _____

22. 73 + 8,263 + 78 + 521 = _____

23. 42 + 3,547 + 8,142 + 467 = _____

24. 8,263 + 990 + 352 + 37 = _____

25. 7,364 + 364 + 902 + 36 = _____

26. 889 + 902 + 836 + 2,431 = _____

27. 390 + 263 + 7,746 + 477 = _____

28. 3,746 + 7,500 + 9,928 + 388 = _____

29. 6,635 + 809 + 300 + 646 = _____

30. 9,745 + 4,869 + 7,089 + 3,745 = _____

31. 36 + 2,006 + 215 + 116 = _____

32. 2,117 + 3,591 + 6,711 + 2,883 = _____

33. 7,001 + 375 + 6 + 39 = _____

Directions Solve the following word problems with addition.

34. Mark collects 178 pounds of scrap iron and 85 pounds of copper. Find the total weight of the metal. _____

35. Tara purchases 280 square feet of carpet for her living room and 250 square feet for her bedroom. Find the total number of square feet she purchases. _____

Name Date Period

Workbook Activity
Chapter 1, Lesson 4
6

Subtraction of Whole Numbers

EXAMPLE Write the problem in vertical form. Subtract.

From 821 subtract 71. 750

$$\begin{array}{r} {\scriptstyle 712} \\ \not{8}\not{2}1 \\ -\ 71 \\ \hline 750 \end{array}$$

Directions Rewrite these subtraction problems in the vertical form. Then subtract.

1. 694 − 22 = _____

2. From 384 subtract 75. _____

3. 602 − 113 = _____

4. From 102 subtract 89. _____

5. 856 − 773 = _____

6. Subtract 871 from 1,029. _____

7. 552 − 498 = _____

8. Subtract 528 from 717. _____

9. 4,852 − 665 = _____

10. From 3,810 subtract 1,922. _____

11. 3,952 − 3,877 = _____

12. Subtract 9,099 from 10,099. _____

13. 12,923 − 8,973 = _____

14. From 16,242 subtract 10,987. _____

15. 3,049 − 1,906 = _____

16. Subtract 786 from 25,004. _____

17. 46,974 − 18,860 = _____

18. From 65,208 subtract 56,987. _____

19. 7,890 − 5,699 = _____

20. Subtract 61,098 from 87,987. _____

21. 67,951 − 56,508 = _____

22. From 10,001 subtract 9,802. _____

23. 78,000 − 6,784 = _____

24. Subtract 675 from 1,000. _____

25. 362,900 − 87,098 = _____

26. Subtract 81,321 from 601,030. _____

27. 70,981 − 69,673 = _____

28. From 508,821 subtract 91,055. _____

Directions Solve the following word problems with subtraction.

29. Van sells 185 tickets to the school's Staff Talent Show.
If he was given 350 tickets to sell, how many does he have left to sell? _____

30. Cassie plans a 475-mile trip. She drives 296 miles the first day.
How many miles must she drive the second day to complete her trip? _____

Multiplication Practice

EXAMPLE Multiply the number in the left column by the number in the top row.

	4
3	12

Directions Fill in the multiplication facts. Multiply each number in the left column by each number on the top row. Write the product of each pair of numbers in the box where the column and the row meet.

1.

×	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0								
1	0	1	2								
2											
3											
4											
5											
6											
7											
8											
9											
10											

2.

×	6	2	3	0	9	10	8	7	5	4	1
2											
9											
5											
4											
8											
0											
7											
6											
3											
1											
10											

Multiplication by Powers of Ten

EXAMPLES

When you multiply a number by 10, write the number. Then write a zero at the end. $235 \times 10 = 2{,}350$

When you multiply a number by 100, write the number. Then write two zeros at the end. $235 \times 100 = 23{,}500$

When you multiply a number by 1,000, write the number. Then write three zeros at the end. $235 \times 1{,}000 = 235{,}000$

Directions Multiply by these powers of ten.

1. $325 \times 10 =$ _____

2. $421 \times 100 =$ _____

3. $4{,}631 \times 10 =$ _____

4. $6{,}023 \times 100 =$ _____

5. $702 \times 100 =$ _____

6. $3{,}011 \times 1{,}000 =$ _____

7. $3{,}203 \times 100 =$ _____

8. $26{,}190 \times 10 =$ _____

9. $1{,}043 \times 100 =$ _____

10. $50{,}783 \times 1{,}000 =$ _____

11. $72 \times 1{,}000 =$ _____

12. $38 \times 1{,}000 =$ _____

13. $106 \times 100 =$ _____

14. $81 \times 100 =$ _____

15. $4{,}123 \times 10 =$ _____

16. $3{,}007 \times 1{,}000 =$ _____

17. $962 \times 1{,}000 =$ _____

18. $300 \times 10 =$ _____

19. $4{,}305 \times 10 =$ _____

20. $4{,}020 \times 1{,}000 =$ _____

21. $412 \times 1{,}000 =$ _____

22. $906 \times 1{,}000 =$ _____

23. $10{,}802 \times 100 =$ _____

24. $104 \times 100 =$ _____

25. $56 \times 10 =$ _____

26. $13 \times 100 =$ _____

27. $9 \times 1{,}000 =$ _____

28. $83 \times 1{,}000 =$ _____

29. $183 \times 1{,}000 =$ _____

30. $7 \times 1{,}000 =$ _____

31. $801 \times 100 =$ _____

32. $334 \times 10 =$ _____

33. $632 \times 10 =$ _____

34. $4{,}567 \times 100 =$ _____

35. $5 \times 100 =$ _____

36. $20{,}304 \times 100 =$ _____

37. $100 \times 1{,}000 =$ _____

38. $20{,}011 \times 100 =$ _____

39. $4{,}302 \times 100 =$ _____

40. $10{,}001 \times 100 =$ _____

Multiplication of Whole Numbers

EXAMPLE Write the problem in vertical form. Multiply.

$52 \times 42 =$ 2,184

$$\begin{array}{r} 52 \\ \times\ 42 \\ \hline 104 \\ +\ 208 \\ \hline 2{,}184 \end{array}$$

Directions Rewrite these multiplication problems in the vertical form and multiply.

1. $24 \times 22 =$ _____

2. $61 \times 18 =$ _____

3. $201 \times 43 =$ _____

4. $85 \times 72 =$ _____

5. $712 \times 66 =$ _____

6. $819 \times 94 =$ _____

7. $465 \times 20 =$ _____

8. $762 \times 300 =$ _____

9. $301 \times 300 =$ _____

10. $784 \times 100 =$ _____

11. $629 \times 150 =$ _____

12. $607 \times 515 =$ _____

13. $5{,}763 \times 501 =$ _____

14. $7{,}114 \times 35 =$ _____

15. $920 \times 724 =$ _____

16. $856 \times 326 =$ _____

17. $3{,}021 \times 307 =$ _____

18. $638 \times 800 =$ _____

19. $4{,}160 \times 110 =$ _____

20. $8{,}522 \times 574 =$ _____

21. $5{,}021 \times 4{,}000 =$ _____

22. $7{,}000 \times 387 =$ _____

23. $5{,}448 \times 673 =$ _____

24. $7{,}361 \times 6{,}000 =$ _____

25. $4{,}000 \times 3{,}000 =$ _____

26. $4{,}000 \times 4{,}000 =$ _____

27. $3{,}500 \times 5{,}100 =$ _____

28. $6{,}702 \times 1{,}023 =$ _____

Directions Solve the following word problems with multiplication.

29. Leah runs 4 miles every day before school for exercise. If she runs 179 days, how many miles will she run? _____

30. Each student in Mr. Brown's class donates 15 sandwiches to the school picnic. If 38 students are in Mr. Brown's class, how many sandwiches are donated? _____

Division of Whole Numbers

EXAMPLE Write the problem in standard form. Divide.

$168 \div 6 =$ 28

$$\begin{array}{r} 28 \\ 6\overline{)168} \\ -\ 12 \\ \hline 48 \\ -\ 48 \\ \hline 0 \end{array}$$

Directions Rewrite the following division problems in the standard form and divide.

1. $128 \div 4 =$ _____

2. $477 \div 9 =$ _____

3. $266 \div 7 =$ _____

4. $480 \div 5 =$ _____

5. $824 \div 8 =$ _____

6. $864 \div 4 =$ _____

7. $1{,}290 \div 10 =$ _____

8. $1{,}771 \div 7 =$ _____

9. $1{,}008 \div 9 =$ _____

10. $3{,}069 \div 9 =$ _____

11. $948 \div 12 =$ _____

12. $1{,}472 \div 16 =$ _____

13. $1{,}360 \div 16 =$ _____

14. $2{,}160 \div 12 =$ _____

15. $3{,}036 \div 6 =$ _____

16. $8{,}844 \div 11 =$ _____

17. $6{,}030 \div 3 =$ _____

18. $5{,}400 \div 6 =$ _____

19. $1{,}710 \div 6 =$ _____

20. $1{,}820 \div 13 =$ _____

21. $14{,}910 \div 21 =$ _____

22. $15{,}625 \div 25 =$ _____

23. $12{,}720 \div 12 =$ _____

24. $13{,}797 \div 27 =$ _____

25. $27{,}060 \div 60 =$ _____

26. $21{,}350 \div 35 =$ _____

27. $11{,}216 \div 16 =$ _____

28. $12{,}030 \div 30 =$ _____

Directions Solve these word problems with division.

29. The Jiffy Messenger Service travels a total of 2,954 miles in one 7-day week. How many miles do the messengers average each day? _____

30. Marvin collects 1,170 bottle tops over a 45-day period. How many bottle tops does he average per day? _____

More Division of Whole Numbers

EXAMPLE

Write the problem in standard form.
1,333 ÷ 9 = _____ Divide.

Express the remainder as a fraction.
Write the remainder over the divisor.

$$\begin{array}{r} 148\ \frac{1}{9} \\ 9\overline{)1{,}333} \\ -\ 9 \\ \hline 43 \\ -\ 36 \\ \hline 73 \\ -\ 72 \\ \hline 1 \end{array}$$

Directions Rewrite the following division problems in the standard form and divide. Express the remainders in fractional form.

1. 1,237 ÷ 6 = _____

2. 898 ÷ 6 = _____

3. 415 ÷ 6 = _____

4. 2,115 ÷ 11 = _____

5. 749 ÷ 6 = _____

6. 1,218 ÷ 12 = _____

7. 863 ÷ 7 = _____

8. 3,017 ÷ 15 = _____

9. 6,915 ÷ 4 = _____

10. 812 ÷ 82 = _____

11. 1,367 ÷ 17 = _____

12. 3,575 ÷ 28 = _____

13. 1,992 ÷ 10 = _____

14. 2,115 ÷ 63 = _____

15. 8,175 ÷ 35 = _____

16. 7,167 ÷ 20 = _____

17. 9,063 ÷ 75 = _____

18. 10,613 ÷ 53 = _____

19. 8,891 ÷ 22 = _____

20. 7,776 ÷ 78 = _____

21. 3,820 ÷ 45 = _____

22. 29,666 ÷ 30 = _____

23. 6,770 ÷ 65 = _____

24. 41,080 ÷ 80 = _____

25. 12,161 ÷ 11 = _____

26. 58,775 ÷ 40 = _____

27. 23,815 ÷ 15 = _____

28. 91,090 ÷ 90 = _____

Directions Solve these word problems with division. Express remainders in fractional form.

29. Maija's mother owned her car for 9 years, driving a total of 136,910 miles. Find the average number of miles driven per year. _____

30. Daniel drove his car 816 miles using 22 gallons of gas. Compute Daniel's gas mileage by dividing the number of miles driven by the number of gallons used. _____

Dividing Numbers by Powers of Ten

EXAMPLE Write the problem in standard form and divide.

480 ÷ 10 =

$$10\overline{)480} \quad 48$$
$$-\ 40$$
$$80$$
$$-\ 80$$
$$0$$

Or move the decimal point one place to the left for each zero in the divisor.

48.0 ÷ 10 =

Directions Divide by these powers of ten.

1. 840 ÷ 10 = _____

2. 65,000 ÷ 100 = _____

3. 2,000 ÷ 100 = _____

4. 4,630 ÷ 10 = _____

5. 9,600 ÷ 100 = _____

6. 140,000 ÷ 1,000 = _____

7. 191,000 ÷ 10 = _____

8. 920,000 ÷ 100 = _____

9. 62,000 ÷ 100 = _____

10. 35,600 ÷ 100 = _____

11. 385,000 ÷ 100 = _____

12. 25,000,000 ÷ 1,000 = _____

13. 4,000,000 ÷ 1,000 = _____

14. 806,000 ÷ 10 = _____

15. 962,000 ÷ 100 = _____

16. 305,000 ÷ 100 = _____

17. 1,800,000 ÷ 1,000 = _____

18. 600,000 ÷ 1,000 = _____

19. 581,000 ÷ 10 = _____

20. 720,600 ÷ 100 = _____

21. 451,000 ÷ 1,000 = _____

22. 390,000 ÷ 10 = _____

23. 680,000 ÷ 100 = _____

24. 4,060,300 ÷ 10 = _____

25. 19,600 ÷ 10 = _____

26. 9,603,000 ÷ 1,000 = _____

27. 5,000,000 ÷ 100 = _____

28. 7,000,000 ÷ 10 = _____

29. 8,000,000 ÷ 100 = _____

30. 123,000 ÷ 1,000 = _____

31. 96,000,000 ÷ 1,000 = _____

32. 43,000 ÷ 1,000 = _____

33. 43,070,600 ÷ 10 = _____

34. 8,000,000 ÷ 10,000 = _____

35. 902,000 ÷ 100 = _____

36. 304,000,000 ÷ 100 = _____

37. 201,111,000 ÷ 10 = _____

38. 76,000,000 ÷ 1,000 = _____

39. 50,000 ÷ 10,000 = _____

40. 240,000 ÷ 10,000 = _____

Basic Operations with Whole Numbers

EXAMPLES

Add.
$$\begin{array}{r} {\scriptstyle 2\ 2} \\ 354 \\ 356 \\ 765 \\ +\ 87 \\ \hline 1{,}562 \end{array}$$

Subtract.
$$\begin{array}{r} {\scriptstyle 1\ 12\ 9\ 14} \\ 2{,}3\cancel{0}\cancel{4} \\ -\ 567 \\ \hline 1{,}737 \end{array}$$

Multiply.
$$\begin{array}{r} 23 \\ \times\ 44 \\ \hline 092 \\ +\ 92 \\ \hline 1{,}012 \end{array}$$

Divide.
$$\begin{array}{r} 1{,}145 \\ 3\overline{)\,3{,}435} \\ -\ 3 \\ \hline 0 \\ \quad 4 \\ -\ 3 \\ \hline \quad 13 \\ -\ 12 \\ \hline \quad 15 \\ -\ 15 \end{array}$$

Directions Add.

1. 243 + 321 + 132 + 68 = _____

2. 5,067 + 23 + 505 + 40 = _____

3. 1,102 + 705 + 4,033 = _____

4. 5,122 + 567 + 504 + 3,402 = _____

5. 30,304 + 4,030 + 20,300 + 1,102 = _____

6. 203,340 + 94,059 + 304,450 = _____

7. 2,000 + 90,089 + 50,481 = _____

8. 10,223 + 4,055 + 506 + 8,690 = _____

Directions Subtract.

9. 2,304 − 567 = _____

10. 304,119 − 4,053 = _____

11. 30,400 − 19,234 = _____

12. 102,556 − 9,806 = _____

13. 134,505 − 5,968 = _____

14. 900,800 − 203,788 = _____

15. 6,578,009 − 456,801 = _____

16. 340,599 − 9,875 = _____

Directions Multiply.

17. 23 × 44 = _____

18. 304 × 32 = _____

19. 579 × 23 = _____

20. 3,011 × 44 = _____

21. 4,503 × 23 = _____

22. 4,053 × 206 = _____

23. 5,098 × 2,304 = _____

24. 40,577 × 3,092 = _____

Directions Divide. Write the remainders in the fractional form.

25. 3,435 ÷ 3 = _____

26. 2,034 ÷ 9 = _____

27. 49,571 ÷ 9 = _____

28. 30,455 ÷ 5 = _____

29. 46,570 ÷ 45 = _____

30. 30,575 ÷ 25 = _____

Averages

EXAMPLE Find the average of these numbers: 25, 73, 80, 73, 33, 95

Step 1 Add.

$$\begin{array}{r} 25 \\ 73 \\ 80 \\ 73 \\ 33 \\ +\ 95 \\ \hline 379 \end{array}$$

Step 2 Divide.

$$\begin{array}{r} 63.16 \approx 63.2 \\ 6\overline{)\,379.00} \\ -\ 36 \\ \hline 19 \\ -\ 18 \\ \hline 1\,0 \\ -\ 6 \\ \hline 40 \\ -\ 36 \end{array}$$

Directions Compute the averages for the sets of numbers. Round to the nearest tenth.

1. 14, 12, 15, 11, 12, 13 _____

2. 83, 78, 53, 92, 67, 27 _____

3. 20, 28, 19, 31, 22, 18, 17, 30 _____

4. 78, 98, 77, 67, 75, 90, 80, 90, 80, 75, 70 _____

5. 30, 31, 37, 33, 38, 35, 32, 39, 34, 36 _____

6. 44, 46, 64, 66, 62, 69, 41, 40 _____

7. 103, 110, 152, 173, 177, 100, 150, 175, 152 _____

8. 205, 273, 198, 350, 220, 180, 280, 220 _____

9. 58, 74, 47, 83, 65, 36, 45, 46, 70, 53, 55, 38 _____

10. 163, 219, 300, 512, 375, 602, 735, 638, 881 _____

11. 3,004, 3,210, 3,387, 3,652, 3,470, 3,521, 3,980, 3,922 _____

12. 5,738, 5,755, 5,746, 5,789, 5,736, 5,725, 5,756, 5,731 _____

13. 230, 310, 222, 725, 600, 390, 512, 525, 510, 400, 500, 683 _____

14. 3,021, 5,361, 2,630, 6,110, 4,002, 3,006, 4,102, 4,120, 4,972, 3,500, 2,310 _____

15. 4,589, 4,530, 4,520, 4,500, 4,530, 4,528, 4,501, 4,554 _____

16. 7,800, 7,853, 7,835, 7,850, 7,812, 7,856, 7,851, 7,820 _____

17. 35, 78, 95, 83, 62, 89, 35, 60, 40, 66, 10, 31, 62, 89, 95 _____

18. 1,239, 1,264, 1,220, 1,250, 1,235, 1,260, 1,285, 1,240, 1,200, 1,290, 1,206 _____

Directions Solve these word problems by computing the average. Round the answers to the nearest tenth.

19. Deborah works as a part-time car mechanic. She works 26 hours her first week. What is her average number of hours worked per day for four days? _____

20. The band sells 523 tickets to its annual concert. There are 13 ticket sellers. Find the average number of tickets sold by each seller. _____

Exponents

EXAMPLE Read the number. Change the number into a problem and write the amount.

$2^3 = 2 \times 2 \times 2 =$ 8

Directions Express the following without exponents.

1. $3^2 =$ _____
2. $4^2 =$ _____
3. $5^3 =$ _____
4. $4^3 =$ _____
5. $6^2 =$ _____
6. $10^2 =$ _____
7. $8^2 =$ _____
8. $2^5 =$ _____
9. $9^3 =$ _____
10. $5^2 =$ _____
11. $4^4 =$ _____
12. $2^4 =$ _____
13. $8^3 =$ _____
14. $9^2 =$ _____
15. $7^2 =$ _____
16. $10^5 =$ _____
17. $3^4 =$ _____
18. $6^3 =$ _____
19. $7^3 =$ _____
20. $11^2 =$ _____
21. $20^3 =$ _____
22. $3^2 =$ _____
23. $5^4 =$ _____
24. $12^2 =$ _____
25. $10^3 =$ _____
26. $3^5 =$ _____
27. $22^3 =$ _____
28. $17^2 =$ _____
29. $15^2 =$ _____
30. $10^4 =$ _____
31. $12^3 =$ _____
32. $13^2 =$ _____
33. $20^2 =$ _____
34. $25^2 =$ _____
35. $15^3 =$ _____
36. $22^2 =$ _____
37. $11^3 =$ _____
38. $6^4 =$ _____
39. $2^6 =$ _____
40. $18^2 =$ _____
41. $4^5 =$ _____
42. $21^2 =$ _____
43. $3^3 =$ _____
44. $10^6 =$ _____
45. $23^2 =$ _____
46. $14^2 =$ _____
47. $50^2 =$ _____
48. $100^2 =$ _____
49. $19^2 =$ _____
50. $33^2 =$ _____
51. $13^3 =$ _____
52. $16^2 =$ _____
53. $25^3 =$ _____
54. $17^3 =$ _____
55. $14^3 =$ _____
56. $5^5 =$ _____
57. $10^7 =$ _____
58. $11^4 =$ _____
59. $12^4 =$ _____
60. $10^9 =$ _____

Order of Operations

EXAMPLE Follow the order of operations. $2 + 4 \times 2 =$ _____

$2 + \quad 8 \quad = \quad 10$

Directions Find the answers. Perform the operations in the correct order.

1. $3 + 5 \times 6 =$ _____

2. $3 \times 4 + 6 - 4 =$ _____

3. $4 \times 8 + 16 \div 2 =$ _____

4. $5 \times 2 - 6 \div 2 =$ _____

5. $4^2 \times 2 + 5 - 32 =$ _____

6. $3 \times 2 \times 2^3 - 4^2 =$ _____

7. $7 + 6 \times 2 - 2 + 2^3 =$ _____

8. $18 - 2 \times 4^2 \div 4 =$ _____

9. $10 + 8 \times 6 \div 12 - 2 =$ _____

10. $13 - 4 \times 5 \div 2 + 10 =$ _____

11. $15 \times 3 - 5^2 + 10 =$ _____

12. $7^2 + 2^4 - 2^3 =$ _____

13. $4 + 17 - 3 \times 7 =$ _____

14. $12^2 - 10^2 + 5 \times 2 =$ _____

15. $10^2 - 2 \times 4 + 3^2 =$ _____

16. $11^2 + 23 - 2^3 + 9 =$ _____

17. $20 - 12 \div 6 \times 3 =$ _____

18. $4^3 - 3 \times 12 \div 6 =$ _____

19. $15 + 4 - 11 + 2^5 =$ _____

20. $12 \times 2 \div 3 \times 2 + 3 =$ _____

21. $8 \times 6 \div 4 - 12 \div 6 =$ _____

22. $2^3 \times 3 \div 6 + 12 - 3 =$ _____

23. $45 \div 15 + 10 - 2^3 =$ _____

24. $15 \div 3 - 5 + 10^2 =$ _____

25. $12^2 \div 6 - 20 + 7 =$ _____

26. $8^2 + 9 \times 3 - 10 =$ _____

27. $18 \div 3^2 - 2 + 5^2 =$ _____

28. $5^3 \div 5 - 10 + 2^3 =$ _____

29. $81 \div 3^2 - 6 + 12 \div 2 =$ _____

30. $3 \times 6 \div 2 - 5 + 7 =$ _____

31. $10^2 \div 5^2 + 5 \times 6 \div 2 =$ _____

32. $25 \div 5^2 \times 5 + 5 - 10 =$ _____

33. $100 \div 10 \times 2^2 + 8 =$ _____

34. $18 - 9 \times 2 \div 3 + 3^2 =$ _____

35. $50 - 40 + 4 \times 7 =$ _____

36. $28 \div 4 \times 6 - 20 =$ _____

37. $3^3 \times 2^2 + 20 \div 2 =$ _____

38. $6^2 \times 3 \div 2 - 4^2 =$ _____

39. $14 \div 2 \times 3 - 21 =$ _____

40. $16 \times 2 \div 4 - 2 + 10 =$ _____

Factors

EXAMPLE

Factor the number.

F_{15} 1×15
3×5

Choose the correct factors.

a. 1, 5, 10, 15
b. 1, 2, 3, 5
c. 1, 3, 5, 15
d. 1, 3, 6, 12

Directions Circle the answer that has the correct factors.

1. 24
a. 1, 2, 4, 6, 8, 12, 14
b. 1, 2, 4, 10, 12, 24
c. 1, 2, 3, 4, 6, 8, 12, 24
d. 2, 4, 6, 8, 10, 12, 24

2. 16
a. 1, 4, 8, 16
b. 1, 2, 4, 16
c. 1, 2, 4, 8, 16
d. 1, 2, 4, 8, 16, 32

3. 32
a. 1, 2, 8, 16, 32
b. 1, 2, 8, 16, 32, 64
c. 1, 2, 4, 8, 16, 32
d. 2, 4, 6, 8, 10, 32

4. 8
a. 2, 4, 8
b. 1, 2, 4, 8
c. 1, 2, 4, 8, 16
d. 1, 2, 4, 8, 12, 24

5. 10
a. 2, 5
b. 1, 2, 5, 10
c. 1, 2, 5, 10, 20
d. 1, 2, 5

6. 52
a. 1, 12, 24, 26, 30, 52
b. 26, 52
c. 1, 2, 4, 13, 26, 52
d. 1, 13, 15, 52

7. 14
a. 2, 7, 11, 14
b. 1, 2, 7, 14, 28
c. 2, 4, 7, 14
d. 1, 2, 7, 14

8. 42
a. 1, 6, 7, 12, 21, 42
b. 1, 2, 3, 6, 7, 14, 21, 42
c. 1, 6, 12, 42
d. 1, 2, 4, 12, 21, 42

9. 13
a. 1, 7, 13
b. 1, 13
c. 1, 7, 13, 26
d. 1, 2, 13, 19

10. 26
a. 1, 2, 20, 26
b. 1, 13, 26
c. 1, 2, 13, 26
d. 1, 26

11. 36
a. 2, 3, 4, 6, 8, 12, 24
b. 1, 2, 3, 4, 6, 9, 12, 18, 36
c. 1, 2, 4, 6, 8, 12, 36
d. 1, 3, 4, 6, 8, 12, 36

12. 12
a. 2, 3, 4, 6, 12
b. 3, 4, 6, 12, 24
c. 2, 4, 6, 24
d. 1, 2, 3, 4, 6, 12

13. 18
a. 1, 2, 3, 6, 9, 18
b. 1, 2, 3, 6, 9, 18, 32
c. 1, 2, 3, 6, 9, 18, 36
d. 1, 2, 3, 4, 6, 7, 18

14. 20
a. 2, 20
b. 2, 5, 10, 15, 20
c. 1, 2, 5, 10, 15, 20
d. 1, 2, 4, 5, 10, 20

15. 22
a. 1, 11, 22
b. 1, 11, 22, 44
c. 1, 2, 11, 22
d. 1, 22, 44

Multiples

EXAMPLE M_4 Find the multiples of 4.

4×0 4×1 4×2 4×3 4×4
0 4 8 12 16

Choose the correct multiples.

a. 0, 1, 2, 4
b. 0, 4, 10, 12
c. 0, 1, 4, 8
(d.) 0, 4, 8, 12

Directions Circle the answer that has the correct multiples. Note: Some multiples may be missing from a correct answer.

1. M_2
- **a.** 2, 4, 6, 8, 11
- **b.** 0, 4, 6, 8, 12
- **c.** 0, 2, 4, 5, 6, 8
- **d.** 0, 2, 3, 4, 5, 6

2. M_{11}
- **a.** 0, 1, 11, 22, 121
- **b.** 0, 11, 22, 33, 44, 56
- **c.** 11, 22, 33, 111
- **d.** 0, 11, 22, 33, 121

3. M_4
- **a.** 0, 2, 4, 6, 8, 16
- **b.** 4, 8, 16, 32, 36
- **c.** 0, 4, 6, 8, 12, 20
- **d.** 0, 14, 28, 56, 100

4. M_6
- **a.** 0, 2, 4, 6, 8, 9
- **b.** 0, 6, 12, 18, 24
- **c.** 1, 6, 12, 18, 24
- **d.** 1, 3, 6, 9, 18, 24

5. M_{30}
- **a.** 0, 10, 30, 60, 90
- **b.** 0, 30, 60, 90, 120
- **c.** 0, 15, 30, 45, 60
- **d.** 1, 15, 30, 40, 60

6. M_3
- **a.** 0, 3, 5, 6, 9, 12
- **b.** 3, 6, 9, 12, 14
- **c.** 0, 3, 6, 12, 15
- **d.** 1, 3, 6, 9, 12, 15

7. M_7
- **a.** 0, 7, 14, 28, 56, 112
- **b.** 0, 3, 7, 14, 28, 35
- **c.** 0, 7, 11, 22, 33, 44
- **d.** 1, 7, 14, 28, 35, 40

8. M_9
- **a.** 0, 9, 18, 27, 36
- **b.** 0, 9, 27, 38, 45
- **c.** 0, 19, 38, 76
- **d.** 0, 1, 2, 3, 4, 5

9. M_{20}
- **a.** 0, 20, 40, 60, 80
- **b.** 0, 20, 30, 40, 50
- **c.** 1, 20, 40, 60, 80
- **d.** 1, 10, 20, 30, 40

10. M_{40}
- **a.** 0, 40, 80, 120, 160
- **b.** 1, 40, 80, 120, 160
- **c.** 1, 20, 40, 60, 80
- **d.** 0, 20, 40, 60, 80

11. M_5
- **a.** 0, 5, 10, 12, 15
- **b.** 0, 10, 15, 20, 30
- **c.** 1, 5, 10, 15, 20
- **d.** 0, 10, 18, 20, 25

12. M_{10}
- **a.** 0, 10, 15, 20, 25
- **b.** 0, 5, 10, 15, 20
- **c.** 10, 15, 20, 25, 30
- **d.** 0, 10, 30, 50, 100

13. M_{12}
- **a.** 0, 12, 24, 36, 44
- **b.** 0, 12, 16, 24, 28
- **c.** 0, 12, 24, 36, 48
- **d.** 0, 10, 12, 14, 16

14. M_{13}
- **a.** 13, 29, 39, 52
- **b.** 0, 13, 23, 39
- **c.** 1, 13, 26, 52
- **d.** 0, 13, 26, 39

15. M_{50}
- **a.** 1, 50, 100, 150
- **b.** 0, 50, 100, 150
- **c.** 1, 25, 50, 75
- **d.** 0, 10, 15, 25

Prime and Composite Numbers

EXAMPLE Identify all the factors of a number. $F_9 = 1, 3, 9$

Tell whether the number is a prime or composite number.

9 has three factors, so it is a composite number.

Directions Write *prime* or *composite* for each number given.

1. 23 _____	**19.** 21 _____	**37.** 12 _____
2. 25 _____	**20.** 44 _____	**38.** 7 _____
3. 45 _____	**21.** 17 _____	**39.** 58 _____
4. 19 _____	**22.** 26 _____	**40.** 98 _____
5. 84 _____	**23.** 102 _____	**41.** 62 _____
6. 29 _____	**24.** 77 _____	**42.** 60 _____
7. 73 _____	**25.** 42 _____	**43.** 22 _____
8. 37 _____	**26.** 54 _____	**44.** 49 _____
9. 55 _____	**27.** 4 _____	**45.** 31 _____
10. 78 _____	**28.** 100 _____	**46.** 1 _____
11. 15 _____	**29.** 27 _____	**47.** 400 _____
12. 220 _____	**30.** 79 _____	**48.** 2 _____
13. 110 _____	**31.** 55 _____	**49.** 3 _____
14. 6 _____	**32.** 204 _____	**50.** 300 _____
15. 120 _____	**33.** 41 _____	
16. 72 _____	**34.** 155 _____	
17. 350 _____	**35.** 29 _____	
18. 410 _____	**36.** 57 _____	

Sets of Numbers

EXAMPLE Identify the set of even numbers. Even numbers are multiples of 2.

1, 2, 3, 5, 6, 8, 10, 12

Set of even numbers 2, 6, 8, 10, 12

Directions Write the sets from the given numbers.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,

21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37,

38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50

1. The set of even numbers

2. The set of odd numbers

3. The set of prime numbers

4. The set of numbers that will divide into 100 with zero as a remainder

5. The set of numbers that is multiples of 3

6. The set of numbers that is multiples of 6

7. The set of numbers that is multiples of 10

8. The set of numbers that is multiples of 100

9. The set of numbers that is factors of 100

10. The set of numbers that is factors of 20

11. The set of numbers that is factors of 10

12. The set of numbers that is factors of 8

13. The set of numbers that is factors of 6

14. The set of numbers that is factors of 30

15. The set of numbers that is factors of 12

Prime Numbers

EXAMPLE

List prime numbers from the given set.

2, 3, 4, 5

Identify prime numbers, which are numbers that have exactly 2 factors.

2 has 2 factors
3 has 2 factors
4 has 3 factors
5 has 2 factors

Prime numbers are 2, 3, 5.

Directions Write the sets from the given numbers.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,

21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37,

38, 39, 40, 41, 42, 43, 44, 45

1. List the prime numbers in order from smallest to largest from the set given.

_____

2. List the even numbers in order from smallest to largest from the set given.

_____

3. List the odd numbers in order from smallest to largest from the set given.

_____

4. Add pairs of prime numbers. Exclude 2 from your additions.

Can you predict an odd or even answer? _____ Summarize your results.

_____

5. Add pairs of odd numbers. Can you predict an odd or even answer? _____
Summarize your results.

_____

6. Add pairs of even numbers. Can you predict an odd or even answer? _____
Summarize your results.

_____

Find the three prime addends for each of the following numbers.

7. 12 = _____

8. 19 = _____

9. 14 = _____

10. 21 = _____

Divisibility Tests

EXAMPLE Use the divisibility test to determine if this number is divisible by 3.

123 Add the digits. 1 + 2 + 3 = 6

Determine if the sum is a multiple of 3. 6 is a multiple of 3.
123 is divisible by 3.

Directions Perform the divisibility test to complete the chart. Write *Yes* or *No* for each space.

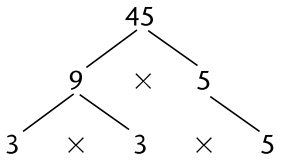
Number	Divisible by 2?	Divisible by 3?	Divisible by 5?
1. 12,034			
2. 31,241			
3. 21,453			
4. 3,040,511			
5. 989,798			
6. 10,233			
7. 20,394			
8. 3,012,211			
9. 50,321			
10. 293,100			

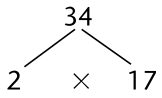
Number	Divisible by 4?	Divisible by 9?	Divisible by 10?
11. 20,349			
12. 13,536			
13. 12,350			
14. 182,340			
15. 125,350			
16. 30,451			
17. 10,800			
18. 100,237			
19. 584,750			
20. 95,832			

Prime Factorization

EXAMPLES Complete factor trees to find prime factorization.

Find prime factors for 45 and 34.





Directions Complete factor trees for these numbers.

1. 48

2. 44

3. 64

4. 36

5. 32

6. 28

7. 39

8. 38

9. 72

10. 52

Least Common Multiple

EXAMPLE Find the LCM (12, 6).

M_{12} = 12, 24, 36

M_6 = 6, 12, 18, 24

LCM (12, 6) = 12

Directions Find the least common multiple and show the steps.

1. Find the LCM (10, 15).

2. Find the LCM (12, 16).

3. Find the LCM (3, 8).

4. Find the LCM (8, 9).

5. Find the LCM (3, 7).

6. Find the LCM (36, 12).

7. Find the LCM (7, 6).

8. Find the LCM (5, 8).

9. Find the LCM (4, 6).

10. Find the LCM (5, 7).

Least Common Multiple/Greatest Common Factor

EXAMPLES Find the factors. Underline greatest common numbers in both sets.

LCM (3, 5)	GCF (10, 25)
M_3 = {0, 3, 9, 12, <u>15</u>, . . .}	F_{10} = {1, 2, <u>5</u>, 10}
M_5 = {0, 5, 10, <u>15</u>, 20, . . .}	F_{25} = {1, <u>5</u>, 25}
LCM (3, 5) = 15	GCF = 5

Directions Find the least common multiple and show the steps.

1. Find the LCM (11, 33).

_____

_____

_____

2. Find the LCM (5, 16).

_____

_____

_____

3. Find the LCM (15, 12).

_____

_____

_____

4. Find the LCM (12, 10).

_____

_____

_____

Directions Find the greatest common factor.

5. GCF (18, 16) _____

6. GCF (8, 36) _____

7. GCF (12, 15) _____

8. GCF (6, 26) _____

9. GCF (18, 4) _____

10. GCF (14, 4) _____

11. GCF (12, 20) _____

12. GCF (32, 36) _____

13. GCF (12, 16) _____

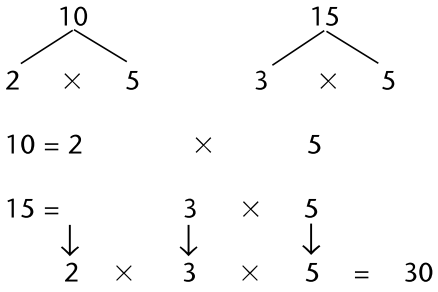
14. GCF (20, 8) _____

15. GCF (20, 15) _____

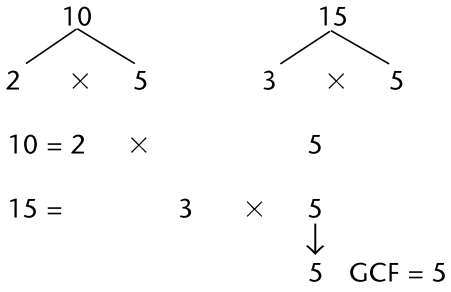
Using Prime Factorization

EXAMPLES

LCM (10, 15)



GCF (10, 15)



Directions Find the least common multiple (LCM) for these pairs of numbers.

1. Find the LCM (25, 15).

2. Find the LCM (5, 12).

3. Find the LCM (16, 18).

4. Find the LCM (27, 9).

Directions Find the greatest common factor (GCF) for each pair of numbers.

5. GCF (10, 25)

6. GCF (20, 30)

7. GCF (22, 77)

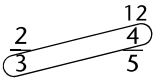
8. GCF (14, 8)

9. GCF (22, 55)

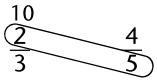
10. GCF (44, 48)

Comparing Fractions

EXAMPLE Cross-multiply numerators and denominators. Compare the products.



$3 \times 4 = 12$



$2 \times 5 = 10$

$\frac{10}{2}$ $\frac{12}{4}$
$\frac{3}{}$ $\frac{5}{}$

$10 < 12$

Directions Compare the fractions in each pair. Use < or > for each pair.

1. $\frac{3}{5}$ $\frac{4}{7}$

2. $\frac{5}{6}$ $\frac{7}{8}$

3. $\frac{5}{7}$ $\frac{7}{8}$

4. $\frac{2}{5}$ $\frac{4}{1}$

5. $\frac{3}{13}$ $\frac{6}{20}$

6. $\frac{3}{8}$ $\frac{9}{20}$

7. $\frac{6}{11}$ $\frac{5}{9}$

8. $\frac{5}{8}$ $\frac{10}{17}$

9. $\frac{1}{2}$ $\frac{5}{11}$

10. $\frac{2}{13}$ $\frac{4}{15}$

11. $\frac{15}{16}$ $\frac{16}{17}$

12. $\frac{2}{13}$ $\frac{3}{14}$

13. $\frac{1}{8}$ $\frac{2}{13}$

14. $\frac{5}{21}$ $\frac{18}{31}$

15. $\frac{2}{15}$ $\frac{6}{21}$

16. $\frac{7}{13}$ $\frac{6}{32}$

17. $\frac{1}{5}$ $\frac{1}{9}$

18. $\frac{2}{21}$ $\frac{3}{31}$

19. $\frac{1}{3}$ $\frac{2}{7}$

20. $\frac{6}{7}$ $\frac{8}{1}$

21. $\frac{3}{5}$ $\frac{1}{2}$

22. $\frac{2}{8}$ $\frac{4}{17}$

23. $\frac{6}{10}$ $\frac{1}{5}$

24. $\frac{5}{10}$ $\frac{10}{21}$

25. $\frac{4}{7}$ $\frac{5}{11}$

26. $\frac{3}{5}$ $\frac{6}{11}$

27. $\frac{4}{5}$ $\frac{2}{20}$

28. $\frac{6}{11}$ $\frac{5}{22}$

29. $\frac{1}{2}$ $\frac{2}{8}$

30. $\frac{4}{11}$ $\frac{8}{21}$

31. $\frac{9}{10}$ $\frac{4}{5}$

32. $\frac{7}{12}$ $\frac{7}{10}$

33. $\frac{6}{9}$ $\frac{12}{17}$

34. $\frac{4}{12}$ $\frac{2}{7}$

35. $\frac{3}{13}$ $\frac{1}{6}$

36. $\frac{8}{15}$ $\frac{15}{16}$

37. $\frac{3}{8}$ $\frac{5}{13}$

38. $\frac{10}{12}$ $\frac{14}{16}$

39. $\frac{2}{6}$ $\frac{4}{14}$

40. $\frac{1}{12}$ $\frac{4}{24}$

41. $\frac{6}{11}$ $\frac{5}{13}$

42. $\frac{2}{4}$ $\frac{10}{22}$

43. $\frac{8}{10}$ $\frac{4}{40}$

44. $\frac{6}{7}$ $\frac{18}{20}$

45. $\frac{4}{6}$ $\frac{8}{10}$

46. $\frac{6}{10}$ $\frac{2}{4}$

47. $\frac{11}{23}$ $\frac{22}{31}$

48. $\frac{9}{15}$ $\frac{18}{31}$

49. $\frac{10}{11}$ $\frac{20}{23}$

50. $\frac{4}{8}$ $\frac{5}{11}$

51. $\frac{10}{23}$ $\frac{15}{32}$

52. $\frac{11}{13}$ $\frac{5}{17}$

53. $\frac{9}{10}$ $\frac{13}{14}$

54. $\frac{7}{11}$ $\frac{8}{12}$

55. $\frac{3}{7}$ $\frac{5}{9}$

56. $\frac{5}{6}$ $\frac{16}{17}$

57. $\frac{2}{11}$ $\frac{2}{3}$

58. $\frac{1}{8}$ $\frac{5}{45}$

59. $\frac{13}{20}$ $\frac{1}{5}$

60. $\frac{7}{10}$ $\frac{6}{15}$

Working with Fractions

EXAMPLE Divide to find out how many times one denominator goes into the other. Multiply the numerator by the quotient.

$\frac{2}{5} = \frac{}{25}$ Divide 25 by 5. $25 \div 5 = 5$

$\frac{2}{5} \times \frac{5}{5} = \frac{10}{25}$

$\frac{2}{5} = \frac{10}{25}$

Directions Express these fractions in higher terms.

1. $\frac{3}{5} = \frac{}{50}$ **2.** $\frac{1}{3} = \frac{}{18}$ **3.** $\frac{5}{6} = \frac{}{24}$ **4.** $\frac{7}{8} = \frac{}{32}$ **5.** $\frac{7}{8} = \frac{}{56}$ **6.** $\frac{3}{7} = \frac{}{21}$ **7.** $\frac{2}{9} = \frac{}{36}$ **8.** $\frac{1}{5} = \frac{}{30}$ **9.** $\frac{1}{4} = \frac{}{20}$ **10.** $\frac{5}{11} = \frac{}{121}$ **11.** $\frac{4}{9} = \frac{}{72}$ **12.** $\frac{3}{11} = \frac{}{44}$ **13.** $\frac{2}{3} = \frac{}{18}$ **14.** $\frac{7}{10} = \frac{}{80}$ **15.** $\frac{3}{4} = \frac{}{16}$

16. $\frac{6}{7} = \frac{}{42}$ **17.** $\frac{7}{13} = \frac{}{39}$ **18.** $\frac{5}{8} = \frac{}{64}$ **19.** $\frac{2}{13} = \frac{}{52}$ **20.** $\frac{1}{9} = \frac{}{99}$ **21.** $\frac{11}{12} = \frac{}{60}$ **22.** $\frac{8}{15} = \frac{}{45}$ **23.** $\frac{6}{19} = \frac{}{76}$ **24.** $\frac{4}{7} = \frac{}{63}$ **25.** $\frac{13}{15} = \frac{}{105}$ **26.** $\frac{8}{17} = \frac{}{34}$ **27.** $\frac{10}{19} = \frac{}{38}$ **28.** $\frac{1}{13} = \frac{}{65}$ **29.** $\frac{10}{11} = \frac{}{55}$ **30.** $\frac{15}{16} = \frac{}{64}$

31. $\frac{5}{14} = \frac{}{56}$ **32.** $\frac{2}{23} = \frac{}{92}$ **33.** $\frac{5}{7} = \frac{}{210}$ **34.** $\frac{4}{13} = \frac{}{39}$ **35.** $\frac{5}{10} = \frac{}{1{,}000}$ **36.** $\frac{9}{17} = \frac{}{51}$ **37.** $\frac{4}{11} = \frac{}{99}$ **38.** $\frac{23}{30} = \frac{}{90}$ **39.** $\frac{3}{7} = \frac{}{84}$ **40.** $\frac{3}{16} = \frac{}{80}$ **41.** $\frac{12}{15} = \frac{}{60}$ **42.** $\frac{5}{6} = \frac{}{54}$ **43.** $\frac{8}{14} = \frac{}{42}$ **44.** $\frac{18}{23} = \frac{}{92}$ **45.** $\frac{9}{22} = \frac{}{220}$

46. $\frac{5}{8} = \frac{}{96}$ **47.** $\frac{5}{21} = \frac{}{105}$ **48.** $\frac{5}{32} = \frac{}{160}$ **49.** $\frac{6}{38} = \frac{}{380}$ **50.** $\frac{35}{70} = \frac{}{280}$ **51.** $\frac{6}{30} = \frac{}{390}$ **52.** $\frac{3}{13} = \frac{}{65}$ **53.** $\frac{5}{11} = \frac{}{121}$ **54.** $\frac{45}{60} = \frac{}{480}$ **55.** $\frac{15}{18} = \frac{}{72}$ **56.** $\frac{8}{52} = \frac{}{156}$ **57.** $\frac{6}{16} = \frac{}{80}$ **58.** $\frac{7}{12} = \frac{}{156}$ **59.** $\frac{9}{29} = \frac{}{145}$ **60.** $\frac{5}{21} = \frac{}{126}$

Renaming Fractions

EXAMPLE Rename fractions by expressing them in lowest terms.
Divide the numerator and denominator by their greatest common factor.

$$\frac{10}{14} = \frac{10 \div 2}{14 \div 2} = \frac{5}{7}$$

Directions Express these fractions and mixed numbers in their lowest terms.

1. $\frac{9}{15} =$ _____
2. $\frac{9}{27} =$ _____
3. $\frac{18}{22} =$ _____
4. $13\frac{10}{15} =$ _____
5. $2\frac{12}{14} =$ _____
6. $\frac{10}{20} =$ _____
7. $\frac{13}{39} =$ _____
8. $\frac{28}{40} =$ _____
9. $\frac{10}{50} =$ _____
10. $6\frac{5}{40} =$ _____
11. $13\frac{70}{80} =$ _____
12. $27\frac{52}{104} =$ _____
13. $\frac{30}{33} =$ _____
14. $9\frac{24}{46} =$ _____
15. $\frac{9}{21} =$ _____
16. $\frac{150}{200} =$ _____
17. $20\frac{18}{57} =$ _____
18. $\frac{46}{52} =$ _____
19. $\frac{28}{120} =$ _____
20. $\frac{102}{128} =$ _____
21. $\frac{178}{220} =$ _____
22. $8\frac{23}{92} =$ _____
23. $51\frac{66}{121} =$ _____
24. $9\frac{15}{33} =$ _____
25. $\frac{44}{108} =$ _____
26. $9\frac{31}{62} =$ _____
27. $6\frac{7}{63} =$ _____
28. $\frac{16}{64} =$ _____
29. $\frac{88}{121} =$ _____
30. $\frac{58}{64} =$ _____
31. $11\frac{62}{92} =$ _____
32. $18\frac{35}{225} =$ _____
33. $\frac{28}{54} =$ _____
34. $\frac{20}{55} =$ _____
35. $\frac{36}{38} =$ _____
36. $\frac{42}{150} =$ _____
37. $\frac{20}{25} =$ _____
38. $\frac{11}{88} =$ _____
39. $\frac{33}{39} =$ _____
40. $\frac{88}{112} =$ _____
41. $\frac{38}{56} =$ _____
42. $\frac{15}{54} =$ _____
43. $\frac{56}{108} =$ _____
44. $\frac{38}{106} =$ _____
45. $\frac{25}{155} =$ _____
46. $\frac{18}{450} =$ _____
47. $\frac{210}{280} =$ _____
48. $\frac{64}{160} =$ _____
49. $\frac{30}{72} =$ _____
50. $\frac{450}{480} =$ _____
51. $\frac{22}{42} =$ _____
52. $\frac{140}{280} =$ _____
53. $\frac{150}{300} =$ _____
54. $\frac{84}{96} =$ _____
55. $\frac{50}{68} =$ _____
56. $\frac{78}{104} =$ _____
57. $\frac{41}{205} =$ _____
58. $\frac{69}{207} =$ _____
59. $\frac{42}{122} =$ _____
60. $\frac{55}{300} =$ _____

Mixed Numbers

EXAMPLE Rename $1\frac{2}{3}$ as an improper fraction $3 \times 1 = 3$ $3 + 2 = 5$ $1\frac{2}{3} = \frac{5}{3}$

Multiply the whole number by the denominator. Then, add the numerator.
Write the new numerator over the same denominator.

Directions Rename these mixed numbers as improper fractions.

1. $2\frac{1}{6} =$ _____ **16.** $2\frac{2}{3} =$ _____ **31.** $3\frac{16}{17} =$ _____ **46.** $7\frac{20}{23} =$ _____

2. $1\frac{1}{2} =$ _____ **17.** $15\frac{1}{3} =$ _____ **32.** $4\frac{2}{19} =$ _____ **47.** $5\frac{5}{60} =$ _____

3. $2\frac{1}{5} =$ _____ **18.** $6\frac{4}{11} =$ _____ **33.** $5\frac{7}{9} =$ _____ **48.** $1\frac{2}{13} =$ _____

4. $1\frac{5}{6} =$ _____ **19.** $15\frac{3}{4} =$ _____ **34.** $5\frac{2}{12} =$ _____ **49.** $3\frac{5}{11} =$ _____

5. $4\frac{1}{5} =$ _____ **20.** $6\frac{2}{5} =$ _____ **35.** $6\frac{3}{13} =$ _____ **50.** $7\frac{2}{25} =$ _____

6. $3\frac{2}{5} =$ _____ **21.** $7\frac{1}{5} =$ _____ **36.** $4\frac{1}{13} =$ _____ **51.** $4\frac{3}{29} =$ _____

7. $1\frac{1}{6} =$ _____ **22.** $33\frac{2}{3} =$ _____ **37.** $7\frac{10}{11} =$ _____ **52.** $4\frac{2}{32} =$ _____

8. $9\frac{2}{7} =$ _____ **23.** $17\frac{1}{2} =$ _____ **38.** $8\frac{13}{15} =$ _____ **53.** $1\frac{7}{18} =$ _____

9. $4\frac{3}{4} =$ _____ **24.** $2\frac{2}{17} =$ _____ **39.** $1\frac{7}{22} =$ _____ **54.** $11\frac{5}{11} =$ _____

10. $2\frac{5}{11} =$ _____ **25.** $9\frac{5}{11} =$ _____ **40.** $3\frac{5}{11} =$ _____ **55.** $20\frac{1}{16} =$ _____

11. $1\frac{5}{9} =$ _____ **26.** $8\frac{5}{13} =$ _____ **41.** $4\frac{5}{20} =$ _____ **56.** $10\frac{2}{17} =$ _____

12. $13\frac{2}{7} =$ _____ **27.** $18\frac{3}{5} =$ _____ **42.** $2\frac{3}{22} =$ _____ **57.** $11\frac{5}{21} =$ _____

13. $20\frac{1}{2} =$ _____ **28.** $3\frac{2}{19} =$ _____ **43.** $5\frac{11}{16} =$ _____ **58.** $5\frac{11}{12} =$ _____

14. $6\frac{2}{9} =$ _____ **29.** $9\frac{10}{11} =$ _____ **44.** $21\frac{2}{61} =$ _____ **59.** $7\frac{2}{30} =$ _____

15. $3\frac{4}{7} =$ _____ **30.** $2\frac{13}{14} =$ _____ **45.** $5\frac{13}{20} =$ _____ **60.** $2\frac{6}{23} =$ _____

Renaming Improper Fractions

EXAMPLE Express the improper fractions as mixed numbers.
Divide the numerator by the denominator.
Simplify if necessary.

$\frac{78}{9}$

$$\begin{array}{r} 8 \\ 9\overline{)78} \\ -\ 72 \\ \hline 6 \end{array}$$

remainder is 6

Solution: $8\frac{6}{9}$ or $8\frac{2}{3}$

Directions Rename the improper fractions as mixed numbers.
Simplify if necessary.

1. $\frac{15}{7} =$ _____

2. $\frac{29}{6} =$ _____

3. $\frac{51}{30} =$ _____

4. $\frac{33}{8} =$ _____

5. $\frac{44}{10} =$ _____

6. $\frac{20}{10} =$ _____

7. $\frac{35}{2} =$ _____

8. $\frac{28}{8} =$ _____

9. $\frac{57}{8} =$ _____

10. $\frac{53}{23} =$ _____

11. $\frac{77}{10} =$ _____

12. $\frac{42}{13} =$ _____

13. $\frac{62}{11} =$ _____

14. $\frac{82}{11} =$ _____

15. $\frac{39}{11} =$ _____

16. $\frac{87}{33} =$ _____

17. $\frac{18}{11} =$ _____

18. $\frac{72}{18} =$ _____

19. $\frac{71}{14} =$ _____

20. $\frac{57}{13} =$ _____

21. $\frac{19}{10} =$ _____

22. $\frac{54}{20} =$ _____

23. $\frac{46}{20} =$ _____

24. $\frac{66}{11} =$ _____

25. $\frac{53}{10} =$ _____

26. $\frac{34}{12} =$ _____

27. $\frac{63}{8} =$ _____

28. $\frac{64}{9} =$ _____

29. $\frac{29}{18} =$ _____

30. $\frac{98}{9} =$ _____

Improper Fractions to Mixed Numbers

EXAMPLE Rename $\frac{13}{5}$. Divide the numerator by the denominator. Simplify if necessary.

$$5\overline{)13}\ 2 \qquad \frac{3}{5}$$
$$-\ 10$$
$$3$$

Directions Rename these improper fractions as mixed numbers. Simplify if necessary.

1. $\frac{14}{6}$ = _____	**16.** $\frac{72}{19}$ = _____	**31.** $\frac{38}{6}$ = _____	**46.** $\frac{91}{8}$ = _____
2. $\frac{16}{7}$ = _____	**17.** $\frac{60}{9}$ = _____	**32.** $\frac{17}{5}$ = _____	**47.** $\frac{76}{7}$ = _____
3. $\frac{28}{7}$ = _____	**18.** $\frac{120}{11}$ = _____	**33.** $\frac{18}{11}$ = _____	**48.** $\frac{89}{11}$ = _____
4. $\frac{15}{2}$ = _____	**19.** $\frac{36}{17}$ = _____	**34.** $\frac{23}{2}$ = _____	**49.** $\frac{48}{23}$ = _____
5. $\frac{33}{4}$ = _____	**20.** $\frac{57}{9}$ = _____	**35.** $\frac{54}{11}$ = _____	**50.** $\frac{98}{46}$ = _____
6. $\frac{18}{5}$ = _____	**21.** $\frac{39}{16}$ = _____	**36.** $\frac{92}{5}$ = _____	**51.** $\frac{88}{23}$ = _____
7. $\frac{25}{4}$ = _____	**22.** $\frac{37}{5}$ = _____	**37.** $\frac{36}{13}$ = _____	**52.** $\frac{105}{15}$ = _____
8. $\frac{62}{6}$ = _____	**23.** $\frac{17}{2}$ = _____	**38.** $\frac{39}{5}$ = _____	**53.** $\frac{28}{6}$ = _____
9. $\frac{30}{7}$ = _____	**24.** $\frac{60}{28}$ = _____	**39.** $\frac{51}{11}$ = _____	**54.** $\frac{100}{7}$ = _____
10. $\frac{35}{8}$ = _____	**25.** $\frac{33}{10}$ = _____	**40.** $\frac{46}{14}$ = _____	**55.** $\frac{49}{3}$ = _____
11. $\frac{18}{8}$ = _____	**26.** $\frac{135}{9}$ = _____	**41.** $\frac{22}{5}$ = _____	**56.** $\frac{65}{2}$ = _____
12. $\frac{30}{4}$ = _____	**27.** $\frac{200}{120}$ = _____	**42.** $\frac{87}{12}$ = _____	**57.** $\frac{85}{17}$ = _____
13. $\frac{75}{25}$ = _____	**28.** $\frac{25}{21}$ = _____	**43.** $\frac{57}{12}$ = _____	**58.** $\frac{59}{9}$ = _____
14. $\frac{72}{10}$ = _____	**29.** $\frac{63}{12}$ = _____	**44.** $\frac{62}{11}$ = _____	**59.** $\frac{99}{10}$ = _____
15. $\frac{26}{3}$ = _____	**30.** $\frac{130}{12}$ = _____	**45.** $\frac{73}{10}$ = _____	**60.** $\frac{46}{3}$ = _____

Multiplication of Fractions

EXAMPLE Multiply numerators. Multiply denominators. Simplify if necessary.

$$\frac{3}{5} \times \frac{7}{8} = \frac{3 \times 7}{5 \times 8} = \frac{21}{40}$$

Directions Multiply these fractions. Simplify the answers to the lowest terms.

1. $\frac{1}{5} \times \frac{3}{4} =$ _____

2. $\frac{4}{5} \times \frac{10}{11} =$ _____

3. $\frac{6}{9} \times \frac{1}{3} =$ _____

4. $\frac{2}{5} \times \frac{4}{10} =$ _____

5. $8 \times \frac{6}{7} =$ _____

6. $\frac{7}{9} \times 1\frac{1}{2} =$ _____

7. $\frac{2}{9} \times 1\frac{1}{8} =$ _____

8. $\frac{3}{11} \times 3\frac{2}{3} =$ _____

9. $\frac{7}{13} \times \frac{13}{5} =$ _____

10. $\frac{8}{11} \times \frac{1}{5} =$ _____

11. $\frac{2}{5} \times \frac{2}{17} =$ _____

12. $\frac{5}{8} \times \frac{3}{8} =$ _____

13. $\frac{4}{6} \times \frac{2}{3} =$ _____

14. $\frac{1}{3} \times \frac{6}{10} =$ _____

15. $\frac{1}{2} \times \frac{3}{5} =$ _____

16. $\frac{35}{38} \times \frac{4}{5} =$ _____

17. $\frac{6}{11} \times 2\frac{5}{6} =$ _____

18. $\frac{7}{12} \times \frac{3}{7} =$ _____

19. $\frac{1}{6} \times \frac{2}{5} =$ _____

20. $\frac{2}{5} \times 2\frac{2}{5} =$ _____

21. $1\frac{3}{7} \times \frac{5}{8} =$ _____

22. $\frac{6}{13} \times 2\frac{1}{6} =$ _____

23. $3\frac{1}{5} \times \frac{3}{11} =$ _____

24. $4\frac{1}{5} \times 7 =$ _____

25. $5\frac{2}{5} \times 10 =$ _____

26. $5\frac{2}{13} \times \frac{1}{6} =$ _____

27. $3\frac{4}{5} \times 65 =$ _____

28. $2\frac{1}{4} \times 4 =$ _____

29. $2\frac{1}{5} \times 5\frac{1}{2} =$ _____

30. $7\frac{2}{5} \times 5\frac{2}{7} =$ _____

31. $2\frac{1}{20} \times 20\frac{5}{10} =$ _____

32. $5\frac{6}{13} \times 1\frac{1}{2} =$ _____

33. $7\frac{1}{5} \times \frac{65}{72} =$ _____

34. $5\frac{2}{7} \times 1\frac{1}{2} =$ _____

35. $7\frac{5}{8} \times 2\frac{3}{4} =$ _____

36. $5\frac{2}{12} \times 1\frac{1}{2} =$ _____

37. $5\frac{4}{11} \times 1\frac{1}{3} =$ _____

38. $3\frac{4}{5} \times 1\frac{1}{2} =$ _____

39. $8\frac{8}{9} \times \frac{18}{20} =$ _____

40. $3\frac{1}{5} \times 5\frac{1}{3} =$ _____

41. $3\frac{1}{3} \times \frac{1}{5} =$ _____

42. $2\frac{3}{7} \times \frac{14}{17} =$ _____

43. $3\frac{5}{6} \times \frac{12}{46} =$ _____

44. $5\frac{2}{7} \times 5 =$ _____

45. $7\frac{2}{5} \times 1\frac{1}{5} =$ _____

Multiplying Mixed Numbers

EXAMPLE Change mixed numbers to improper fractions. Multiply. Simplify if necessary.

$2\frac{1}{5} \times \frac{1}{5} =$

$\frac{11}{5} \times \frac{1}{5} = \frac{11}{25}$

Directions Multiply these fractions.

1. $4\frac{2}{5} \times 1\frac{3}{5} =$ _____

2. $1\frac{1}{6} \times 1\frac{2}{7} =$ _____

3. $3\frac{1}{3} \times 1\frac{3}{5} =$ _____

4. $\frac{3}{7} \times 1\frac{1}{5} =$ _____

5. $\frac{1}{7} \times 2\frac{1}{4} =$ _____

6. $1\frac{1}{13} \times 2\frac{3}{7} =$ _____

7. $2\frac{1}{4} \times 2\frac{1}{3} =$ _____

8. $1\frac{1}{3} \times 3\frac{1}{2} =$ _____

9. $2\frac{2}{3} \times \frac{1}{6} =$ _____

10. $1\frac{1}{3} \times 2\frac{2}{5} =$ _____

11. $\frac{1}{5} \times 2\frac{1}{3} =$ _____

12. $2\frac{5}{6} \times 1\frac{5}{7} =$ _____

13. $2\frac{1}{3} \times 3\frac{1}{5} =$ _____

14. $2\frac{2}{3} \times 3\frac{1}{3} =$ _____

15. $\frac{3}{5} \times 3\frac{1}{3} =$ _____

Dividing Fractions

EXAMPLE Invert the divisor. Multiply. Simplify if necessary.

$$\frac{2}{5} \div \frac{3}{7} =$$

$$\frac{2}{5} \times \frac{7}{3} = \frac{14}{15}$$

Directions Divide these fractions. Remember to invert the divisor. Show your work. See the example.

1. $\frac{3}{10} \div \frac{4}{5} =$

2. $\frac{13}{12} \div \frac{15}{18} =$

3. $\frac{5}{9} \div \frac{8}{12} =$

4. $\frac{7}{5} \div \frac{10}{15} =$

5. $\frac{4}{12} \div \frac{6}{8} =$

6. $\frac{8}{9} \div \frac{6}{7} =$

7. $\frac{5}{12} \div \frac{7}{8} =$

8. $\frac{7}{10} \div \frac{10}{15} =$

9. $\frac{2}{7} \div \frac{7}{8} =$

10. $\frac{1}{7} \div \frac{3}{14} =$

11. $\frac{9}{14} \div \frac{18}{21} =$

12. $\frac{12}{14} \div \frac{6}{7} =$

13. $\frac{8}{9} \div \frac{6}{9} =$

14. $\frac{6}{7} \div \frac{2}{9} =$

15. $\frac{4}{5} \div \frac{16}{20} =$

16. $\frac{1}{6} \div \frac{5}{12} =$

17. $\frac{1}{5} \div \frac{3}{5} =$

18. $\frac{14}{15} \div \frac{14}{15} =$

19. $\frac{3}{7} \div \frac{9}{10} =$

20. $\frac{14}{16} \div \frac{15}{20} =$

Division of Fractions

EXAMPLE Invert the divisor. Multiply and simplify if necessary.

$$\frac{3}{5} \div \frac{2}{5} = \frac{3}{5} \times \frac{5}{2}$$

$$= \frac{3}{\cancel{5}_{1}} \times \frac{\cancel{5}^{1}}{2}$$

$$= \frac{3 \times 1}{1 \times 2}$$

$$= \frac{3}{2} = 1\frac{1}{2}$$

Directions Divide these fractions. Simplify the answers to the lowest terms.

1. $\frac{3}{7} \div \frac{1}{7} =$ _____

2. $\frac{6}{7} \div \frac{2}{9} =$ _____

3. $\frac{5}{13} \div \frac{25}{26} =$ _____

4. $\frac{15}{16} \div \frac{3}{8} =$ _____

5. $\frac{6}{13} \div \frac{2}{13} =$ _____

6. $\frac{3}{10} \div 1\frac{4}{5} =$ _____

7. $\frac{6}{11} \div 2\frac{1}{5} =$ _____

8. $\frac{4}{5} \div \frac{24}{25} =$ _____

9. $\frac{5}{7} \div \frac{14}{15} =$ _____

10. $\frac{1}{2} \div \frac{1}{3} =$ _____

11. $\frac{5}{2} \div 1\frac{1}{2} =$ _____

12. $\frac{4}{3} \div 2\frac{1}{5} =$ _____

13. $\frac{1}{5} \div \frac{3}{4} =$ _____

14. $\frac{9}{10} \div \frac{2}{5} =$ _____

15. $\frac{2}{5} \div \frac{1}{8} =$ _____

16. $5\frac{2}{8} \div \frac{1}{8} =$ _____

17. $\frac{12}{17} \div \frac{15}{21} =$ _____

18. $\frac{1}{3} \div 2\frac{1}{2} =$ _____

19. $2\frac{3}{4} \div \frac{11}{16} =$ _____

20. $5\frac{3}{5} \div 2\frac{1}{10} =$ _____

21. $2\frac{1}{5} \div \frac{1}{5} =$ _____

22. $3\frac{2}{7} \div \frac{46}{21} =$ _____

23. $1\frac{2}{5} \div 2\frac{2}{3} =$ _____

24. $1\frac{2}{8} \div 2\frac{1}{2} =$ _____

25. $\frac{5}{16} \div 1\frac{1}{2} =$ _____

26. $7\frac{1}{2} \div 22\frac{1}{2} =$ _____

27. $5\frac{2}{3} \div 1\frac{5}{12} =$ _____

28. $\frac{3}{7} \div 1\frac{3}{11} =$ _____

29. $2\frac{1}{6} \div 1\frac{1}{2} =$ _____

30. $3\frac{5}{13} \div \frac{22}{39} =$ _____

31. $5 \div 1\frac{1}{6} =$ _____

32. $11 \div 3\frac{4}{33} =$ _____

33. $4\frac{3}{11} \div 6 =$ _____

34. $4\frac{1}{2} \div \frac{36}{38} =$ _____

35. $3\frac{2}{7} \div 1\frac{1}{2} =$ _____

36. $2\frac{5}{6} \div 17 =$ _____

37. $1\frac{5}{9} \div 1\frac{2}{5} =$ _____

38. $2\frac{3}{5} \div \frac{1}{5} =$ _____

39. $5\frac{3}{8} \div 1\frac{1}{16} =$ _____

40. $1\frac{3}{11} \div 5 =$ _____

Addition of Fractions with Like Denominators

EXAMPLE Add numerators. Keep the denominator.

$$\begin{array}{r} \frac{5}{12} \\ +\ \frac{6}{12} \\ \hline \frac{11}{12} \end{array}$$

Directions Add these fractions. Simplify the answers.

1. $\begin{array}{r} \frac{2}{7} \\ +\ \frac{4}{7} \\ \hline \end{array}$

2. $\begin{array}{r} \frac{3}{16} \\ +\ \frac{2}{16} \\ \hline \end{array}$

3. $\begin{array}{r} \frac{5}{15} \\ +\ \frac{3}{15} \\ \hline \end{array}$

4. $\begin{array}{r} \frac{7}{21} \\ +\ \frac{7}{21} \\ \hline \end{array}$

5. $\begin{array}{r} \frac{8}{9} \\ +\ \frac{5}{9} \\ \hline \end{array}$

6. $\begin{array}{r} 5\frac{2}{3} \\ +\ 2\frac{1}{3} \\ \hline \end{array}$

7. $\begin{array}{r} \frac{2}{9} \\ +\ \frac{3}{9} \\ \hline \end{array}$

8. $\begin{array}{r} \frac{2}{17} \\ +\ \frac{5}{17} \\ \hline \end{array}$

9. $\begin{array}{r} \frac{3}{20} \\ +\ \frac{2}{20} \\ \hline \end{array}$

10. $\begin{array}{r} 2\frac{2}{18} \\ +\ 3\frac{3}{18} \\ \hline \end{array}$

11. $\begin{array}{r} 6\frac{7}{10} \\ +\ \frac{9}{10} \\ \hline \end{array}$

12. $\begin{array}{r} 12\frac{7}{11} \\ +\ 3\frac{2}{11} \\ \hline \end{array}$

13. $\begin{array}{r} \frac{5}{13} \\ +\ \frac{8}{13} \\ \hline \end{array}$

14. $\begin{array}{r} \frac{7}{18} \\ +\ \frac{2}{18} \\ \hline \end{array}$

15. $\begin{array}{r} \frac{6}{20} \\ +\ \frac{5}{20} \\ \hline \end{array}$

16. $\begin{array}{r} 4\frac{6}{23} \\ +\ 5\frac{17}{23} \\ \hline \end{array}$

17. $\begin{array}{r} 5\frac{5}{26} \\ +\ \frac{24}{26} \\ \hline \end{array}$

18. $\begin{array}{r} 35\frac{5}{6} \\ +\ 5 \\ \hline \end{array}$

19. $\begin{array}{r} 4 \\ +\ 6\frac{2}{5} \\ \hline \end{array}$

20. $\begin{array}{r} 7\frac{2}{13} \\ +\ \frac{11}{13} \\ \hline \end{array}$

Addition of Fractions with Unlike Denominators

EXAMPLE To add fractions and mixed numbers with unlike denominators, find the least common multiple of the denominators. Raise the fraction to higher terms and add.

$$\begin{array}{rcl} \frac{5}{6} & = & \frac{15}{18} \\ +\ \frac{2}{18} & = & +\ \frac{2}{18} \\ \hline & = & \frac{17}{18} \end{array}$$

Directions Add these fractions. Simplify the answers.

1. $\frac{4}{9} + \frac{1}{3}$ _____

2. $\frac{7}{18} + \frac{1}{3}$ _____

3. $5\frac{3}{7} + 2\frac{1}{14}$ _____

4. $10\frac{2}{7} + 3\frac{5}{34}$ _____

5. $25\frac{6}{35} + 4\frac{3}{70}$ _____

6. $\frac{5}{9} + \frac{4}{18}$ _____

7. $\frac{4}{21} + \frac{1}{7}$ _____

8. $6\frac{3}{20} + 4\frac{2}{5}$ _____

9. $23\frac{1}{7} + 2\frac{5}{14}$ _____

10. $38\frac{1}{12} + 2\frac{4}{60}$ _____

11. $\frac{6}{25} + \frac{4}{5}$ _____

12. $\frac{8}{35} + \frac{2}{7}$ _____

13. $8\frac{3}{20} + \frac{3}{4}$ _____

14. $37\frac{4}{8} + 5\frac{7}{24}$ _____

15. $3\frac{3}{5} + 2\frac{1}{20}$ _____

16. $\frac{12}{35} + 7\frac{7}{210}$ _____

17. $18\frac{1}{6} + 3\frac{1}{72}$ _____

18. $8\frac{3}{21} + 2\frac{1}{7}$ _____

19. $8\frac{1}{5} + 10\frac{1}{55}$ _____

20. $12\frac{5}{28} + 4\frac{5}{56}$ _____

More Addition of Fractions

EXAMPLE To add fractions and mixed numbers with unlike denominators, find the least common multiple of the denominators. Raise the fraction to higher terms and add.

$$\begin{array}{rcl} \frac{5}{9} & = & \frac{35}{63} \\ +\ \frac{3}{7} & = & +\ \frac{27}{63} \\ \hline & = & \frac{62}{63} \end{array}$$

Directions Add these fractions. Simplify the answers.

1. $\frac{11}{20} + \frac{4}{7}$

2. $\frac{5}{11} + \frac{4}{7}$

3. $2\frac{5}{7} + 5\frac{6}{8}$

4. $5\frac{4}{9} + 3\frac{2}{11}$

5. $16\frac{5}{12} + 4\frac{3}{5}$

6. $\frac{3}{13} + \frac{1}{5}$

7. $\frac{3}{7} + \frac{9}{9}$

8. $\frac{5}{12} + 6\frac{4}{10}$

9. $6\frac{3}{13} + 4\frac{5}{6}$

10. $9\frac{5}{11} + 6\frac{2}{5}$

11. $\frac{6}{22} + \frac{4}{5}$

12. $\frac{7}{11} + \frac{10}{12}$

13. $2\frac{7}{13} + 9\frac{3}{10}$

14. $3\frac{5}{7} + 2\frac{9}{11}$

15. $4\frac{7}{13} + 2\frac{3}{5}$

16. $3\frac{4}{7} + 7\frac{3}{8}$

17. $28\frac{5}{7} + 6\frac{4}{9}$

18. $4\frac{1}{12} + 6\frac{2}{7}$

19. $35\frac{4}{19} + 2\frac{3}{10}$

20. $12\frac{8}{15} + \frac{1}{4}$

Addition of Mixed Numbers

EXAMPLE Add the fractions. Find the lowest common multiple if necessary. Add the whole numbers. Simplify to lowest terms.

$$\begin{array}{r} 3\frac{2}{13} \\ +\ 4\frac{1}{13} \\ \hline 7\frac{3}{13} \end{array}$$

Directions Add these fractions. Simplify the answers to the lowest terms.

1. $2\frac{3}{10} + 3\frac{1}{10}$ = _____

2. $18\frac{5}{16} + 3\frac{1}{8}$ = _____

3. $81\frac{2}{15} + 2\frac{2}{3}$ = _____

4. $18\frac{2}{11} + 4\frac{5}{6}$ = _____

5. $23\frac{4}{7} + 8$ = _____

6. $4\frac{2}{5} + 3\frac{1}{5}$ = _____

7. $7\frac{1}{4} + \frac{1}{3}$ = _____

8. $17 + 2\frac{1}{5}$ = _____

9. $29\frac{2}{5} + 3\frac{5}{6}$ = _____

10. $16\frac{3}{13} + \frac{4}{39}$ = _____

11. $6\frac{5}{21} + 2\frac{1}{7}$ = _____

12. $13\frac{5}{16} + 2\frac{1}{4}$ = _____

13. $10\frac{3}{7} + 2\frac{4}{5}$ = _____

14. $13\frac{3}{22} + 5\frac{3}{44}$ = _____

Directions Rewrite the fractions in the standard form and add. Simplify the answers to the lowest terms.

15. $1\frac{1}{2} + 2\frac{3}{11} =$ _____

16. $2\frac{3}{5} + 4\frac{1}{6} =$ _____

17. $7\frac{1}{7} + 5\frac{1}{8} =$ _____

18. $6\frac{2}{9} + 1\frac{3}{10} =$ _____

19. $10 + 2\frac{1}{6} =$ _____

20. $5\frac{2}{12} + \frac{1}{10} =$ _____

Subtraction of Fractions with Like Denominators

EXAMPLE Subtract numerators. Keep denominators. Simplify if necessary.

$$\begin{array}{r} \frac{7}{8} \\ -\ \frac{3}{8} \\ \hline \frac{4}{8} \end{array} \quad = \quad \frac{1}{2}$$

Directions Subtract these fractions and simplify your answers.

1. $\begin{array}{r} \frac{18}{35} \\ -\ \frac{9}{35} \\ \hline \end{array}$

2. $\begin{array}{r} 3\frac{7}{12} \\ -\ 2\frac{2}{12} \\ \hline \end{array}$

3. $\begin{array}{r} 8\frac{13}{15} \\ -\ 3\frac{4}{15} \\ \hline \end{array}$

4. $\begin{array}{r} 16\frac{11}{20} \\ -\ \frac{6}{20} \\ \hline \end{array}$

5. $\begin{array}{r} 7\frac{2}{33} \\ -\ 5 \\ \hline \end{array}$

6. $\begin{array}{r} \frac{13}{16} \\ -\ \frac{5}{16} \\ \hline \end{array}$

7. $\begin{array}{r} 5\frac{15}{18} \\ -\ 2\frac{3}{18} \\ \hline \end{array}$

8. $\begin{array}{r} 11\frac{12}{41} \\ -\ 5\frac{6}{41} \\ \hline \end{array}$

9. $\begin{array}{r} 8\frac{5}{28} \\ -\ 5 \\ \hline \end{array}$

10. $\begin{array}{r} 13\frac{17}{18} \\ -\ 4\frac{8}{18} \\ \hline \end{array}$

11. $\begin{array}{r} \frac{10}{21} \\ -\ \frac{7}{21} \\ \hline \end{array}$

12. $\begin{array}{r} 11\frac{4}{10} \\ -\ \frac{1}{10} \\ \hline \end{array}$

13. $\begin{array}{r} 30\frac{18}{33} \\ -\ 5\frac{7}{33} \\ \hline \end{array}$

14. $\begin{array}{r} 31\frac{14}{27} \\ -\ 4\frac{5}{27} \\ \hline \end{array}$

15. $\begin{array}{r} 15\frac{3}{16} \\ -\ 4\frac{1}{16} \\ \hline \end{array}$

16. $\begin{array}{r} 13\frac{4}{29} \\ -\ 3\frac{2}{29} \\ \hline \end{array}$

17. $\begin{array}{r} 8\frac{33}{56} \\ -\ 2\frac{5}{56} \\ \hline \end{array}$

18. $\begin{array}{r} 33\frac{37}{45} \\ -\ \frac{2}{45} \\ \hline \end{array}$

19. $\begin{array}{r} 13\frac{17}{38} \\ -\ \frac{7}{38} \\ \hline \end{array}$

20. $\begin{array}{r} 25\frac{7}{33} \\ -\ 4\frac{4}{33} \\ \hline \end{array}$

Subtraction of Fractions Without Renaming

EXAMPLE Raise fractions to higher terms. Subtract numerators and whole numbers. Simplify if necessary.

$$\begin{array}{rcl} 15\frac{2}{3} & = & 15\frac{14}{21} \\ -\ 6\frac{2}{7} & = & -\ 6\frac{6}{21} \\ \hline & = & 9\frac{8}{21} \end{array}$$

Directions Subtract these fractions. Simplify the answers to the lowest terms.

1. $25\frac{1}{8} - 24\frac{1}{9}$

2. $28\frac{12}{15} - 4\frac{2}{5}$

3. $52\frac{3}{10} - 2\frac{5}{17}$

4. $3\frac{15}{21} - 1\frac{1}{5}$

5. $51\frac{5}{9} - 4\frac{4}{10}$

6. $22\frac{7}{8} - 3\frac{1}{24}$

7. $26\frac{4}{9} - 4\frac{1}{8}$

8. $14\frac{5}{11} - 7\frac{2}{7}$

9. $7\frac{2}{18} - 5\frac{1}{20}$

10. $28\frac{4}{21} - 4\frac{1}{7}$

11. $25\frac{12}{38} - 9\frac{3}{19}$

12. $33\frac{4}{7} - 6\frac{1}{7}$

13. $4\frac{11}{16} - 2\frac{3}{32}$

14. $16\frac{7}{28} - 5\frac{3}{28}$

15. $16\frac{3}{10} - 2\frac{1}{5}$

16. $8\frac{1}{2} - 5\frac{3}{9}$

17. $42\frac{6}{7} - 5\frac{1}{6}$

18. $2\frac{1}{3} - 1\frac{2}{15}$

19. $5\frac{1}{13} - 2\frac{1}{15}$

20. $14\frac{2}{15} - \frac{1}{16}$

Subtraction of Fractions with Renaming

EXAMPLE Rename the fractions and subtract them. Subtract the whole numbers. Simplify if necessary.

$$\begin{array}{rcr} 19\frac{1}{5} & = & 18\frac{6}{5} \\ -\ 2\frac{3}{5} & = & -\ 2\frac{3}{5} \\ \hline & & 16\frac{3}{5} \end{array}$$

Directions Subtract these fractions. Simplify the answers to the lowest terms.

1. $13\frac{1}{8} - 1\frac{7}{8}$ = _____

2. $28\frac{1}{3} - 5\frac{2}{3}$ = _____

3. $13\frac{2}{19} - 2\frac{5}{19}$ = _____

4. $14\frac{2}{17} - 5\frac{3}{17}$ = _____

5. $26\frac{5}{28} - 4\frac{6}{28}$ = _____

6. $28\frac{2}{7} - 5\frac{5}{7}$ = _____

7. $4\frac{3}{9} - \frac{5}{9}$ = _____

8. $6\frac{4}{11} - 1\frac{6}{11}$ = _____

9. $29\frac{5}{17} - 28\frac{9}{17}$ = _____

10. $42\frac{16}{50} - 2\frac{25}{50}$ = _____

11. $12\frac{2}{17} - 3\frac{5}{17}$ = _____

12. $6 - \frac{3}{12}$ = _____

13. $8\frac{3}{21} - 5\frac{7}{21}$ = _____

14. $32\frac{13}{35} - 5\frac{15}{35}$ = _____

15. $32 - 4\frac{5}{22}$ = _____

16. $7 - 5\frac{11}{12}$ = _____

17. $67 - 5\frac{17}{18}$ = _____

18. $8\frac{7}{20} - 5\frac{11}{20}$ = _____

19. $5 - 2\frac{17}{20}$ = _____

20. $9\frac{11}{20} - 5\frac{12}{20}$ = _____

More Subtraction of Fractions with Renaming

EXAMPLE Rename the fractions and subtract them. Subtract the whole numbers. Simplify if necessary.

$$\begin{array}{rcrcr} 3\frac{2}{5} & = & 3\frac{16}{40} & = & 2\frac{56}{40} \\ -\ 2\frac{7}{8} & = & -\ 2\frac{35}{40} & = & -\ 2\frac{35}{40} \\ \hline & & & & \frac{21}{40} \end{array}$$

Directions Subtract these fractions. Simplify the answers.

1. $4\frac{3}{4} - 3\frac{5}{6}$ = _____

2. $14\frac{2}{9} - 5\frac{7}{8}$ = _____

3. $11\frac{1}{5} - \frac{1}{4}$ = _____

4. $38\frac{2}{11} - 4\frac{5}{22}$ = _____

5. $45\frac{9}{11} - 4\frac{21}{22}$ = _____

6. $6\frac{4}{13} - 5\frac{25}{26}$ = _____

7. $16\frac{9}{13} - 4\frac{18}{26}$ = _____

8. $29\frac{1}{15} - 2\frac{3}{4}$ = _____

9. $12 - 2\frac{10}{11}$ = _____

10. $11\frac{1}{16} - \frac{1}{2}$ = _____

11. $4 - 2\frac{3}{5}$ = _____

12. $3\frac{1}{2} - 2\frac{6}{7}$ = _____

13. $18\frac{2}{15} - 5\frac{3}{4}$ = _____

14. $13\frac{3}{16} - 4\frac{7}{8}$ = _____

15. $23\frac{4}{7} - 22\frac{9}{14}$ = _____

16. $9\frac{1}{3} - 4\frac{11}{13}$ = _____

17. $12\frac{14}{15} - 10\frac{29}{30}$ = _____

18. $10\frac{2}{5} - 5\frac{10}{11}$ = _____

19. $10\frac{2}{7} - 8\frac{11}{14}$ = _____

20. $4\frac{5}{16} - 2\frac{3}{8}$ = _____

Subtraction of Fractions

EXAMPLE Change to common denominators if necessary. Rename top mixed number if necessary. Subtract numerators. Simplify if necessary.

$$\begin{array}{rcrcr} 1\frac{7}{18} & = & 1\frac{7}{18} & = & \frac{25}{18} \\ -\frac{5}{9} & = & -\frac{10}{18} & = & -\frac{10}{18} \\ \hline & & & & \frac{15}{18} = \frac{5}{6} \end{array}$$

Directions Subtract these fractions. Simplify the answers to the lowest terms.

1. $\begin{array}{r} \frac{7}{18} \\ -\frac{3}{18} \\ \hline \end{array}$

2. $\begin{array}{r} 16\frac{12}{13} \\ -3\frac{1}{26} \\ \hline \end{array}$

3. $\begin{array}{r} 33\frac{1}{5} \\ -2\frac{3}{4} \\ \hline \end{array}$

4. $\begin{array}{r} 23\frac{7}{18} \\ -\frac{3}{72} \\ \hline \end{array}$

5. $\begin{array}{r} 2\frac{5}{13} \\ -\frac{4}{13} \\ \hline \end{array}$

6. $\begin{array}{r} 4\frac{15}{16} \\ -2\frac{3}{8} \\ \hline \end{array}$

7. $\begin{array}{r} 18 \\ -5\frac{2}{7} \\ \hline \end{array}$

8. $\begin{array}{r} 5\frac{1}{10} \\ -2\frac{7}{15} \\ \hline \end{array}$

9. $\begin{array}{r} 16\frac{2}{7} \\ -2\frac{3}{7} \\ \hline \end{array}$

10. $\begin{array}{r} 10\frac{13}{24} \\ -2\frac{1}{6} \\ \hline \end{array}$

11. $\begin{array}{r} 13 \\ -2\frac{3}{11} \\ \hline \end{array}$

12. $\begin{array}{r} 12 \\ -6\frac{3}{13} \\ \hline \end{array}$

13. $\begin{array}{r} 16\frac{3}{10} \\ -1\frac{5}{10} \\ \hline \end{array}$

14. $\begin{array}{r} 7\frac{5}{11} \\ -3 \\ \hline \end{array}$

15. $\begin{array}{r} 59\frac{1}{15} \\ -2\frac{3}{45} \\ \hline \end{array}$

16. $\begin{array}{r} 12\frac{3}{16} \\ -5\frac{11}{48} \\ \hline \end{array}$

Directions Rewrite the fractions in the standard form and subtract. Simplify the answers to the lowest terms.

17. $3\frac{1}{4} - 2\frac{7}{8} =$ _____

18. $13\frac{2}{15} - 3\frac{4}{5} =$ _____

19. $6\frac{5}{12} - 4\frac{1}{5} =$ _____

20. $38 - 2\frac{3}{7} =$ _____

Name Date Period

Workbook Activity 46
Chapter 3, Lesson 15

Basic Operations with Fractions and Mixed Numbers

EXAMPLES

Add.

$$\begin{array}{r} \frac{3}{4} \\ + \frac{3}{4} \\ \hline \frac{6}{4} = 1\frac{1}{2} \end{array}$$

Subtract.

$$\begin{array}{r} 1\frac{5}{8} \\ - 1\frac{3}{8} \\ \hline \frac{2}{8} = \frac{1}{4} \end{array}$$

Multiply.

$$\frac{\cancel{2}^{1}}{\cancel{3}_{1}} \times \frac{\cancel{3}^{1}}{\cancel{10}_{5}} = \frac{1}{5}$$

Divide.

$$\frac{1}{4} \div \frac{7}{8} = \frac{1}{\cancel{4}_{1}} \times \frac{\cancel{8}^{2}}{7} = \frac{2}{7}$$

Directions Add.

1. $2\frac{1}{3} + 3\frac{1}{3} =$ __________

2. $4\frac{1}{8} + 2\frac{2}{8} =$ __________

3. $1\frac{1}{5} + \frac{1}{10} =$ __________

4. $2\frac{1}{6} + 3\frac{2}{3} =$ __________

5. $4\frac{1}{7} + 1\frac{3}{14} =$ __________

6. $1\frac{1}{8} + 2\frac{1}{6} =$ __________

Directions Subtract.

7. $5\frac{2}{8} - 1\frac{1}{4} =$ __________

8. $2\frac{2}{3} - 1\frac{1}{2} =$ __________

9. $4\frac{7}{8} - 1\frac{3}{4} =$ __________

10. $6\frac{2}{8} - 2\frac{3}{4} =$ __________

11. $35 - 6\frac{2}{7} =$ __________

12. $41\frac{3}{5} - 6 =$ __________

Directions Multiply.

13. $\frac{5}{6} \times \frac{2}{3} =$ __________

14. $\frac{4}{11} \times \frac{22}{10} =$ __________

15. $\frac{1}{2} \times \frac{2}{3} =$ __________

16. $2\frac{3}{5} \times 1\frac{1}{3} =$ __________

17. $6\frac{2}{9} \times \frac{1}{2} =$ __________

18. $1\frac{1}{8} \times 2\frac{3}{5} =$ __________

Directions Divide.

19. $\frac{6}{8} \div \frac{18}{24} =$ __________

20. $\frac{5}{6} \div \frac{25}{30} =$ __________

21. $\frac{4}{11} \div \frac{18}{20} =$ __________

22. $1\frac{1}{2} \div \frac{3}{6} =$ __________

23. $2\frac{1}{4} \div \frac{9}{10} =$ __________

24. $2\frac{3}{5} \div \frac{26}{30} =$ __________

25. $1\frac{2}{9} \div 1\frac{1}{2} =$ __________

Place Value

EXAMPLE Look at the underlined digit. Write the place value for the underlined digit.

3.7<u>5</u>4 hundredths

Directions Write the place value for each underlined digit.

1. 2.3<u>4</u> _____

2. 1.2<u>0</u>345 _____

3. 1.023<u>0</u>1 _____

4. 12.<u>0</u>1012 _____

5. 0.000<u>1</u>2 _____

6. 12.00200 _____

7. 1.2<u>2</u>008 _____

8. 840.<u>8</u>8940 _____

9. 2.10769 _____

10. 502.00<u>1</u> _____

11. 3.400<u>1</u> _____

12. 7.<u>3</u>309 _____

13. 1.0<u>0</u>23 _____

14. 0.002<u>0</u>03 _____

15. 3.0041<u>0</u> _____

16. 23.0001<u>9</u> _____

Directions Underline the place value indicated.

17. 12.0002	ten-thousandths	**24.** 0.010102	millionths
18. 0.012	tenths	**25.** 2.09077	hundred-thousandths
19. 0.00023	hundred-thousandths	**26.** 10.10230	hundred-thousandths
20. 0.00012	thousandths	**27.** 530.0002	tenths
21. 1.02304	tenths	**28.** 2.93001	ten-thousandths
22. 102.0023	tenths	**29.** 0.0112887	millionths
23. 3.04958	ten-thousandths	**30.** 1.0234	tenths

Reading and Writing Numerals

EXAMPLES Look at the underlined digit. Write the name of the place.

3.14<u>3</u> thousandths

Start at the left. Write the word for the numerals.
Use *and* to stand for the decimal point.

1.63 one and sixty-three hundredths

Directions Write the name of the place for each underlined digit.

1. 12.<u>1</u>8		**9.** 8.0<u>2</u>63		**17.** 3.<u>0</u>4	
2. 0.9<u>2</u>0		**10.** 4.0<u>0</u>05		**18.** 0.003<u>7</u>05	
3. 1.03<u>4</u>		**11.** 4.590<u>2</u>1		**19.** 0.003<u>0</u>4	
4. 3.05<u>7</u>8		**12.** 295.<u>1</u>1		**20.** 59.0<u>4</u>92	
5. 64.23<u>8</u>1		**13.** 5.02<u>8</u>48		**21.** 83.3<u>9</u>051	
6. 0.0<u>0</u>3		**14.** 45.9221<u>0</u>		**22.** 19.4603<u>1</u>	
7. 152.<u>9</u>		**15.** 394.0<u>2</u>64		**23.** 44.<u>9</u>12	
8. 24.0223<u>1</u>		**16.** 385.0448<u>5</u>		**24.** 5.6105<u>6</u>	

Directions Write the following numerals in words.

25. 9.032

26. 0.0024

27. 102.10245

28. 0.010139

29. 40.044

30. 410.00003

Translation of Decimal Numbers

EXAMPLE Read the amount. Write it in numerals. Remember, *and* stands for the decimal point.

Five and seventy-one hundredths 5.71

Directions Write the following amounts in numerals.

1. Twenty-three and six tenths _____

2. Forty-one and three hundredths _____

3. Seventy-two thousandths _____

4. Five and eight tenths _____

5. Six and three thousandths _____

6. One hundred two thousandths _____

7. Four hundred three thousandths _____

8. Two and two hundredths _____

9. Six hundred thirty-four ten-thousandths _____

10. Six thousand, three hundred forty-eight hundred-thousandths _____

11. Twenty thousand, four hundred five hundred-thousandths _____

12. One hundred two and seven hundredths _____

13. Eight hundred two and seven hundred fifty-one thousandths _____

14. One thousand, nine hundred three and seven hundredths _____

15. Two thousand and twenty-six thousandths _____

16. Four thousand three and seven ten-thousandths _____

17. Two hundred six thousandths _____

18. Three hundred-thousandths _____

19. Thirty-four hundred-thousandths _____

20. One and fifty-nine hundredths _____

Comparing and Rounding Decimals

EXAMPLE Order numbers from least to greatest.

1.059 0.0159 0.159

Least → Greatest

0.0159 0.159 1.059

Directions Arrange each set in order from least to greatest.

1.	0.6234	62.350	0.7406	_____	_____	_____
2.	0.0045	0.0450	0.0040	_____	_____	_____
3.	2.0049	2.0050	2.034	_____	_____	_____
4.	0.1024	0.1031	0.113	_____	_____	_____
5.	23.0045	23.004	2.30045	_____	_____	_____
6.	304.097	300.999	304.102	_____	_____	_____
7.	3.00495	30.0495	0.300495	_____	_____	_____
8.	9.00603	9.00599	9.000999	_____	_____	_____
9.	0.356924	0.350899	0.400001	_____	_____	_____
10.	5.04592	6.001	0.939401	_____	_____	_____

EXAMPLE Round to the nearest hundredth. Round up if thousandth is 5 or greater.

5.136

5.14

Directions Round the following numbers to the nearest:

	Tenth		Hundredth		Thousandth
11. 245.44	_____	**19.** 0.0394	_____	**28.** 0.08931	_____
12. 4.091	_____	**20.** 199.051	_____	**29.** 0.00592	_____
13. 2.0399	_____	**21.** 6.34499	_____	**30.** 10.122309	_____
14. 0.048	_____	**22.** 0.995	_____	**31.** 0.39	_____
15. 30.9199	_____	**23.** 666.034	_____	**32.** 390.0485	_____
16. 0.048539	_____	**24.** 394.091999	_____	**33.** 3,998.0002	_____
17. 5.0555	_____	**25.** 0.0951	_____	**34.** 8.89099	_____
18. 49.952	_____	**26.** 495.0495	_____	**35.** 4.76842	_____
		27. 40.0495	_____		

Addition of Decimals

EXAMPLE Write the problem in vertical form. Then add.

2.3 + 4 + 0.09 + 59 =

2.3	2.30
4.	4.00
0.09	0.09
+ 59.	+ 59.00
65.39	65.39

Directions Rewrite the following addends in vertical form and add.

1. 3.4 + 5 + 0.18 + 17 = _____

2. 0.056 + 3.02 + 4 + 1.2 = _____

3. 19 + 9.3 + 0.049 + 3 = _____

4. 30.9 + 5 + 0.91 + 0.922 = _____

5. 0.08 + 1 + 1.1 + 6.2 = _____

6. 2.331 + 0.1123 + 7 + 1.8 = _____

7. 16 + 4.05 + 5 + 4.77 = _____

8. 65.94 + 4.7 + 1 + 7.2 = _____

9. 5.906 + 0.071 + 44.581 = _____

10. 3.045 + 0.045 + 84.3 = _____

11. 0.9639 + 0.0082 + 5.03 = _____

12. 7.304 + 1.5 + 8.33 + 2 = _____

13. 7004.1 + 35.066 + 0.06 = _____

14. 93 + 0.739 + 2.38 + 0.1 = _____

15. 4.4 + 3.5 + 23.49 + 6 = _____

16. 6.06 + 33 + 0.045 + 3 = _____

17. 5 + 6 + 6.9 + 0.082 = _____

18. 6.112 + 4.7 + 6 + 0.0001 = _____

19. 9.9 + 5.03 + 5.5 + 0.002 = _____

20. 47.05 + 6.2 + 0.4 + 1 = _____

21. 54 + 2.2 + 0.01 + 6.9 = _____

22. 2.334 + 0.1128 + 8.3 = _____

23. 4.056 + 3.5 + 7 + 0.92 = _____

24. 5 + 6.1 + 55.6 + 0.01 = _____

25. 6.001 + 4.9 + 3 + 0.05 = _____

26. 1 + 2.1 + 5.66 + 0.031 = _____

27. 9.9 + 3.4 + 0.56 + 0.012 = _____

28. 6.035 + 3.4 + 5 + 0.057 = _____

Directions Solve the following word problems with addition.

29. Compute the total amount deposited if Lance's deposits are $15, $1.90, $121, and $2.65. _____

30. It rains three times during the first week of summer vacation. Compute the total amount if it rains 2.05 inches, 0.29 inches, and 3 inches. _____

Name Date Period

Workbook Activity
Chapter 4, Lesson 5
52

Subtraction of Decimals

EXAMPLE Write the problem in vertical form. Then subtract.

$1.03 - 0.94 =$

$$\begin{array}{r} {\scriptstyle 0\ 9\ 13} \\ 1.\not{0}\not{3} \\ -\ 0.94 \\ \hline 0.09 \end{array}$$

Directions Rewrite these problems in vertical form. Then subtract.

1. $6.34 - 0.14 =$ _____

2. From 23.034 subtract 0.0341 _____

3. $20 - 0.934 =$ _____

4. Subtract 12.92 from 27.104 _____

5. $103.506 - 94 =$ _____

6. Subtract 0.607 from 2 _____

7. $2.3941 - 0.2852 =$ _____

8. From 1.0182 subtract 0.81818 _____

9. $34.8 - 5.0837 =$ _____

10. From 2 subtract 1.9283 _____

11. $0.0238 - 0.003856 =$ _____

12. Subtract 9.9 from 10.005 _____

13. $1.3 - 1.0953 =$ _____

14. Subtract 0.0056 from 0.9 _____

15. $58.3 - 12.923 =$ _____

16. From 4.95 subtract 2.5 _____

17. $71 - 5.341 =$ _____

18. Subtract 0.3945 from 6 _____

19. $0.304 - 0.0433 =$ _____

20. From 205.5 subtract 0.56 _____

21. $4.59 - 2.4 =$ _____

22. Subtract 2.3 from 5 _____

23. $4.5 - 0.0954 =$ _____

24. From 6.94 subtract 0.9567 _____

25. $49 - 5.607 =$ _____

26. Subtract 0.0384 from 1.991 _____

27. $3 - 0.4581 =$ _____

28. From 86 subtract 0.86 _____

Directions Solve the following word problems with subtraction.

29. Diana saves $25 for school clothes and purchases a blouse costing $9.96. How much money does she have left? _____

30. Ross drives 298.6 miles on a two-day vacation. If he drives 150 miles on the first day, how many miles does he drive on the second day? _____

Name Date Period

Workbook Activity
Chapter 4, Lesson 6
53

Multiplication of Decimals by Powers of Ten

EXAMPLE Write the problem in vertical form. Then multiply. Remember the decimal point.

2.63 × 10 =

$$\begin{array}{r} 2.63 \\ \times\ 10 \\ \hline 26.30 \end{array}$$

Directions Rewrite the following problems in vertical form and multiply.

1. 6.25 × 10 = _____

2. 5.638 × 10 = _____

3. 0.06 × 100 = _____

4. 0.072 × 100 = _____

5. 1.061 × 10 = _____

6. 5.63 × 100 = _____

7. 3.14 × 100 = _____

8. 1.414 × 1,000 = _____

9. 0.00627 × 1,000 = _____

10. 0.2802 × 10 = _____

11. 0.0605 × 100 = _____

12. 0.7701 × 100 = _____

13. 1.101 × 1,000 = _____

14. 7.6 × 100 = _____

15. 5.1 × 1,000 = _____

16. 8.81 × 10,000 = _____

17. 3.7 × 10,000 = _____

18. 2.05 × 10,000 = _____

19. 0.0001 × 1,000 = _____

20. 5.6 × 100 = _____

21. 69.1 × 1,000 = _____

22. 0.777 × 1,000 = _____

23. 0.201 × 10,000 = _____

24. 0.028 × 10 = _____

25. 0.002 × 1,000 = _____

26. 1.1 × 1,000 = _____

27. 10 × 1.67 = _____

28. 1,000 × 0.003 = _____

29. 100 × 0.1505 = _____

30. 10 × 1.688 = _____

31. 1,000 × 3.9 = _____

32. 100 × 3.702 = _____

33. 10 × 0.1 = _____

34. 1,000 × 0.11 = _____

35. 3.44 × 100 = _____

36. 1.112 × 1,000 = _____

37. 0.00232 × 10,000 = _____

38. 0.012 × 10,000 = _____

39. 3.033 × 10 = _____

40. 8.014 × 1,000 = _____

41. 0.0556 × 10,000 = _____

42. 5.5 × 100 = _____

43. 0.6709 × 100 = _____

44. 0.0021 × 1,000 = _____

45. 23.1 × 100 = _____

Name Date Period

Workbook Activity
Chapter 4, Lesson 6
54

Multiplication of Decimals

EXAMPLE Write the problem in vertical form. Then multiply. Remember the decimal point.

$1.2 \times 0.04 =$

$$\begin{array}{r} 1.2 \\ \times \quad .04 \\ \hline 48 \\ 00 \\ \hline 0.048 \end{array}$$

Directions Rewrite the following problems in vertical form and multiply.

1. $3.5 \times 0.11 =$ _____

2. $48 \times 1.5 =$ _____

3. $4.05 \times 0.03 =$ _____

4. $3.6 \times 0.93 =$ _____

5. $56.7 \times 0.31 =$ _____

6. $0.059 \times 0.12 =$ _____

7. $9.01 \times 1.03 =$ _____

8. $5.8 \times 0.0004 =$ _____

9. $0.0034 \times 23 =$ _____

10. $6.12 \times 3.4 =$ _____

11. $7.81 \times 56 =$ _____

12. $5.25 \times 0.01 =$ _____

13. $6.79 \times 8.3 =$ _____

14. $0.044 \times 0.9 =$ _____

15. $0.09 \times 0.04 =$ _____

16. $7.05 \times 0.3 =$ _____

17. $98 \times 0.11 =$ _____

18. $0.931 \times 100 =$ _____

19. $7.02 \times 5.1 =$ _____

20. $0.034 \times 0.0048 =$ _____

21. $1{,}000 \times 0.00342 =$ _____

22. $405 \times 1.52 =$ _____

23. $8.8 \times 6.7 =$ _____

24. $13.5 \times 4.7 =$ _____

25. $69.1 \times 0.001 =$ _____

26. $10.4 \times 10.5 =$ _____

27. $0.059 \times 0.0691 =$ _____

28. $0.101 \times 121.1 =$ _____

Directions Solve the following word problems with multiplication.

29. Lionel works part-time with a construction company and earns $24.50 per day. How much will Lionel earn working 5 days? _____

30. Regina earns $7.50 per hour straight time. Compute Regina's time and one-half rate by finding the product of $7.50 and 1.5. _____

Scientific Notation with Positive Exponents

EXAMPLE Write in scientific notation. $2{,}300{,}000 = 2.3 \times 10^6$

- 10^6 ← an exponent
- 10^6 ← a power of ten
- 2.3 ← a number between one and ten

Directions Rewrite the following numbers using scientific notation.

1. 4,200 = _____
2. 6,250 = _____
3. 82,100 = _____
4. 50,000 = _____
5. 72,300 = _____
6. 15,080 = _____
7. 1,800 = _____
8. 29,000 = _____
9. 500,000 = _____
10. 600,000 = _____
11. 700,000,000 = _____
12. 7,800,000 = _____
13. 10,000 = _____
14. 35,600 = _____
15. 81.52 = _____
16. 17.63 = _____
17. 236.5 = _____
18. 3,800 = _____
19. 19,000 = _____
20. 16.12 = _____
21. 610,000,000 = _____
22. 400,000,000 = _____
23. 790,000 = _____
24. 25.33 = _____
25. 1,420,000 = _____
26. 1,000,000,000 = _____
27. 34,000,000 = _____
28. 103,000 = _____
29. 23,000 = _____
30. 450,000,000 = _____
31. 11,000 = _____
32. 401,300 = _____
33. 311,400 = _____
34. 102.3 = _____
35. 927,000 = _____
36. 211,400 = _____
37. 100,000 = _____
38. 10,000 = _____
39. 344,000,000,000 = _____
40. 42,000,000,000 = _____
41. 12,000,000 = _____
42. 41,000,000 = _____
43. 764,200,000 = _____
44. 911,400,000 = _____
45. 102,000 = _____

Name Date Period

Workbook Activity
Chapter 4, Lesson 7
56

Scientific Notation with Negative Exponents

EXAMPLE Write in scientific notation. $0.006 = 6 \times 10^{-3}$

- 6: a number between one and ten
- 10^{-3}: a power of ten
- -3: a negative exponent

Directions Rewrite the following numbers using scientific notation.

1. 0.008 = _____
2. 0.0715 = _____
3. 0.0062 = _____
4. 0.0007 = _____
5. 0.02 = _____
6. 0.0321 = _____
7. 0.0805 = _____
8. 0.0006 = _____
9. 0.00005 = _____
10. 0.03051 = _____
11. 0.00091 = _____
12. 0.0000007 = _____
13. 0.000003 = _____
14. 0.00000021 = _____
15. 0.0061 = _____
16. 0.00054 = _____
17. 0.000003 = _____
18. 0.00101 = _____
19. 0.000005 = _____
20. 0.000052 = _____
21. 0.000735 = _____
22. 0.0001433 = _____
23. 0.00021 = _____
24. 0.00093 = _____
25. 0.000000004 = _____
26. 0.00000000062 = _____
27. 0.423 = _____
28. 0.00316 = _____
29. 0.005071 = _____
30. 0.000078 = _____
31. 0.002103 = _____
32. 0.0000000005 = _____
33. 0.00000123 = _____
34. 0.00203 = _____
35. 0.000222 = _____
36. 0.0121 = _____
37. 0.10203 = _____
38. 0.000204 = _____
39. 0.0691 = _____
40. 0.0000203 = _____
41. 0.0000000304 = _____
42. 0.3044 = _____
43. 0.00077 = _____
44. 0.002058 = _____
45. 0.0004058 = _____

Scientific Notation in Standard Form

EXAMPLES Write in standard form.

5.1×10^2

$5.10. = 510$

(1 2)

5.1×10^{-2}

$0.05.1 = 0.051$

(2 1)

Directions Rewrite each scientific notation in standard form.

1. $5.6 \times 10^2 =$ _____

2. $1.5 \times 10^2 =$ _____

3. $2 \times 10^4 =$ _____

4. $8 \times 10^3 =$ _____

5. $4.65 \times 10^3 =$ _____

6. $1.73 \times 10^4 =$ _____

7. $6.203 \times 10^5 =$ _____

8. $2.414 \times 10^5 =$ _____

9. $8.5 \times 10^7 =$ _____

10. $3 \times 10^7 =$ _____

11. $2 \times 10^1 =$ _____

12. $5.16 \times 10^2 =$ _____

13. $8.2 \times 10^3 =$ _____

14. $1.2 \times 10^1 =$ _____

15. $7.502 \times 10^2 =$ _____

16. $3.0052 \times 10^2 =$ _____

17. $2.61 \times 10^3 =$ _____

18. $5.85 \times 10^4 =$ _____

19. $7.05 \times 10^4 =$ _____

20. $6 \times 10^4 =$ _____

21. $3.008 \times 10^3 =$ _____

22. $1.9 \times 10^2 =$ _____

23. $4.002 \times 10^4 =$ _____

24. $7 \times 10^{10} =$ _____

25. $1.9 \times 10^{-8} =$ _____

26. $3 \times 10^{-9} =$ _____

27. $5.03 \times 10^{-1} =$ _____

28. $4.06 \times 10^{-4} =$ _____

29. $6.003 \times 10^{-5} =$ _____

30. $1.01 \times 10^{-5} =$ _____

31. $4.5 \times 10^{-5} =$ _____

32. $5.012 \times 10^{-3} =$ _____

33. $6 \times 10^{-5} =$ _____

34. $7.01 \times 10^{-4} =$ _____

35. $2.34 \times 10^{-3} =$ _____

36. $4.535 \times 10^{-2} =$ _____

37. $1 \times 10^{-8} =$ _____

38. $1.024 \times 10^{-2} =$ _____

39. $4.441 \times 10^{-5} =$ _____

40. $7.002 \times 10^{-4} =$ _____

41. $2.001 \times 10^{-8} =$ _____

42. $3.3 \times 10^{-3} =$ _____

43. $6.77 \times 10^{-4} =$ _____

44. $4.001 \times 10^{-3} =$ _____

45. $5 \times 10^{-10} =$ _____

Scientific Notation

EXAMPLE Write in scientific notation. $0.00563 = 0.\overset{1}{0}\overset{2}{0}\overset{3}{5}63 = 5.63 \times 10^{-3}$

Directions Rewrite the following numbers using scientific notation.

1. 2,300,000 = _____

2. 59,000 = _____

3. 0.0005 = _____

4. 0.0000039 = _____

5. 23.41 = _____

6. 453 = _____

7. 25,400,000 = _____

8. 0.000000000843 = _____

9. 1,900,000,000 = _____

10. 39,400,000 = _____

11. 0.00000837 = _____

12. 567.2 = _____

13. 0.0001 = _____

14. 4,000 = _____

15. 0.00495 = _____

16. 567,000,000,000,000 = _____

EXAMPLE Write in standard form. $5.63 \times 10^{-3} = 0.\overset{3}{0}\overset{2}{0}\overset{1}{5}63 = 0.00563$

Directions Write the following numbers in standard form without exponents.

17. $2.3 \times 10^3 =$ _____

18. $4.29 \times 10^5 =$ _____

19. $8 \times 10^6 =$ _____

20. $5.7 \times 10^5 =$ _____

21. $4.94 \times 10^{-8} =$ _____

22. $7.03 \times 10^{-7} =$ _____

23. $6.1 \times 10^{10} =$ _____

24. $5.5 \times 10^{-3} =$ _____

25. $6.832 \times 10^6 =$ _____

26. $8.11 \times 10^{-2} =$ _____

27. $3 \times 10^{12} =$ _____

28. $1.35 \times 10^{-5} =$ _____

29. $1.39 \times 10^7 =$ _____

30. $9.04 \times 10^{-4} =$ _____

Division of Decimals by Powers of Ten

EXAMPLE Write in standard form. Divide 53 ÷ 10 =

$$\begin{array}{r} 5.3 \\ 10\overline{)53.0} \\ -\ 50 \\ \hline 3\ 0 \\ -\ 3\ 0 \\ \hline 0 \end{array}$$

Directions Rewrite the following division problems in the standard form and divide.

1. 62 ÷ 10 = _____
2. 7.7 ÷ 100 = _____
3. 0.07 ÷ 100 = _____
4. 39 ÷ 1,000 = _____
5. 3 ÷ 10 = _____
6. 4.07 ÷ 100 = _____
7. 3.02 ÷ 100 = _____
8. 8.4 ÷ 1,000 = _____
9. 100 ÷ 1,000 = _____
10. 5.6 ÷ 10 = _____
11. 7 ÷ 100 = _____
12. 6.2 ÷ 1,000 = _____
13. 1.8 ÷ 1,000 = _____
14. 94 ÷ 100 = _____
15. 5 ÷ 1,000 = _____
16. 13 ÷ 1,000 = _____
17. 2.6 ÷ 1,000 = _____
18. 8.6 ÷ 100 = _____
19. 0.0023 ÷ 10 = _____
20. 2 ÷ 1,000 = _____
21. 3.8 ÷ 100 = _____
22. 4.02 ÷ 10,000 = _____
23. 566 ÷ 1,000 = _____
24. 2,963 ÷ 1,000 = _____
25. 8,203 ÷ 10,000 = _____
26. 4,002 ÷ 100 = _____
27. 0.706 ÷ 10 = _____
28. 9 ÷ 1,000 = _____
29. 0.04 ÷ 100 = _____
30. 0.3006 ÷ 100 = _____
31. 0.35 ÷ 1,000 = _____
32. 4.02 ÷ 100 = _____
33. 17 ÷ 1,000 = _____
34. 1 ÷ 1,000 = _____
35. 4.2 ÷ 10,000 = _____
36. 0.02 ÷ 10,000 = _____
37. 45.7 ÷ 10,000 = _____
38. 5,023.5 ÷ 10,000 = _____
39. 51.5 ÷ 1,000 = _____
40. 6.66 ÷ 10,000 = _____
41. 3.02 ÷ 1,000 = _____
42. 728 ÷ 10 = _____
43. 936 ÷ 10,000 = _____
44. 641.02 ÷ 10,000 = _____
45. 5.5 ÷ 100 = _____

Division of Decimals

EXAMPLE Write in standard form.
Move decimal. Divide 23.4 by 0.1 =

$$0.1\overline{)23.4} = 234$$
$$-\ 2$$
$$03$$
$$-\ 3$$
$$04$$
$$-\ 4$$
$$0$$

Directions Rewrite the following division problems in the standard form and divide. Round each quotient to the nearest hundredth.

1. 14.4 ÷ 0.7 = _____
2. 0.46 ÷ 0.4 = _____
3. 0.98 ÷ 0.8 = _____
4. 10 ÷ 5.5 = _____
5. 1.5 ÷ 0.9 = _____
6. 2.6 ÷ 1.5 = _____
7. 0.06 ÷ 0.7 = _____
8. 40 ÷ 1.2 = _____
9. 7.7 ÷ 0.03 = _____
10. 5.6 ÷ 0.12 = _____
11. 12.3 ÷ 1.1 = _____
12. 6.99 ÷ 1.2 = _____
13. 9.12 ÷ 0.9 = _____
14. 28.04 ÷ 0.7 = _____
15. 3.5 ÷ 3 = _____
16. 6.33 ÷ 0.07 = _____
17. 1 ÷ 0.9 = _____
18. 2.2 ÷ 13 = _____
19. 30 ÷ 89 = _____
20. 5.06 ÷ 1.2 = _____
21. 5 ÷ 1.5 = _____
22. 49.9 ÷ 3.4 = _____
23. 2 ÷ 4.5 = _____
24. 0.506 ÷ 0.403 = _____
25. 4.06 ÷ 2.02 = _____
26. 0.0008 ÷ 0.04 = _____
27. 0.045 ÷ 0.08 = _____
28. 3.91 ÷ 2.6 = _____

Directions Solve the following word problems with division.

29. Kathleen purchases tomatoes for lunch. If the tomatoes are priced at 4 pounds for $4.24, how much will she pay for one pound?

30. A carton of six colas sells for $4.62. How much does one cola cost?

Basic Operations with Decimals

EXAMPLES

Add.

$$\begin{array}{r} 2.3 \\ +\ 5.67 \\ \hline 7.97 \end{array}$$

Subtract.

$$\begin{array}{r} {\scriptstyle 5\ 9\ 10} \\ 3\not{6}.\not{0}\not{0} \\ -\ 0.93 \\ \hline 35.07 \end{array}$$

Multiply.

$$\begin{array}{r} 2.2 \\ \times\ \ .9 \\ \hline 1.98 \end{array}$$

Divide.

$$\begin{array}{r} .3822 \\ 9\overline{)3.4400} \\ -\ 27 \\ \hline 74 \\ -\ 72 \\ \hline 20 \\ -\ 18 \\ \hline 20 \\ -\ 18 \\ \hline 2 \end{array}$$

Directions Add.

1. 2.3 + 5.67 = _____

2. 45 + 9.97 + 0.055 = _____

3. 3.04 + 0.056 + 0.7 = _____

4. 67.3 + 34.09 + 4.45 = _____

5. 0.0745 + 0.45 + 0.087202 = _____

6. 3.45 + 0.0923 + 3.07 = _____

7. 2.33 + 0.76 + 74.9 + 4.4 = _____

8. 0.0348 + 0.2 + 4 + 4.45 = _____

Directions Subtract.

9. 36 − 0.93 = _____

10. 4.5 − 2.09 = _____

11. 5.943 − 0.56 = _____

12. 0.0982 − 0.039 = _____

13. 2.9 − 0.8033 = _____

14. 50.4 − 28.48 = _____

15. 1 − 0.97 = _____

16. 345 − 23.9 = _____

Directions Multiply.

17. 2.2 × 0.9 = _____

18. 34 × 5.2 = _____

19. 6.7 × 0.67 = _____

20. 45.3 × 0.23= _____

21. 30.5 × 4.5 = _____

22. 3.409 × 0.42 = _____

23. 90.4 × 2.11 = _____

24. 5.63 × 0.941 = _____

Directions Divide. Round the quotients to the nearest hundredths.

25. 3.44 ÷ 9 = _____

26. 98.3 ÷ 20 = _____

27. 1.304 ÷ 1.1 = _____

28. 36 ÷ 0.7 = _____

29. 3 ÷ 1.7 = _____

30. 5.606 ÷ 25 = _____

Decimals to Fractions

EXAMPLE Rename 0.6 as a fraction. Simplify if necessary.

$0.6 = \frac{6}{10} = \frac{3}{5}$

Directions Rewrite each decimal as a fraction or a mixed number. Simplify the answers to the lowest terms.

1. 0.51 =	_____	**25.** 0.9 =	_____	**49.** 0.353 =	_____
2. 0.07 =	_____	**26.** 0.102 =	_____	**50.** 7.2 =	_____
3. 0.5 =	_____	**27.** 0.052 =	_____	**51.** 0.0004 =	_____
4. 0.2 =	_____	**28.** 0.0071 =	_____	**52.** 0.1004 =	_____
5. 0.003 =	_____	**29.** 0.004 =	_____	**53.** 46.85 =	_____
6. 0.007 =	_____	**30.** 0.38 =	_____	**54.** 0.999 =	_____
7. 0.75 =	_____	**31.** 15.1 =	_____	**55.** 0.122 =	_____
8. 0.82 =	_____	**32.** 3.75 =	_____	**56.** 0.01 =	_____
9. 0.15 =	_____	**33.** 0.25 =	_____	**57.** 0.106 =	_____
10. 1.5 =	_____	**34.** 2.25 =	_____	**58.** 0.004 =	_____
11. 0.62 =	_____	**35.** 1.82 =	_____	**59.** 0.147 =	_____
12. 0.085 =	_____	**36.** 0.21 =	_____	**60.** 54.06 =	_____
13. 0.008 =	_____	**37.** 1.002 =	_____	**61.** 1.85 =	_____
14. 0.001 =	_____	**38.** 0.52 =	_____	**62.** 9.43 =	_____
15. 2.6 =	_____	**39.** 0.42 =	_____	**63.** 7.78 =	_____
16. 0.022 =	_____	**40.** 2.125 =	_____	**64.** 4.14 =	_____
17. 0.04 =	_____	**41.** 0.54 =	_____	**65.** 0.335 =	_____
18. 20.6 =	_____	**42.** 0.0085 =	_____	**66.** 1.38 =	_____
19. 5.03 =	_____	**43.** 4.48 =	_____	**67.** 0.34 =	_____
20. 4.1 =	_____	**44.** 1.53 =	_____	**68.** 0.554 =	_____
21. 200.6 =	_____	**45.** 10.5 =	_____	**69.** 0.332 =	_____
22. 0.0012 =	_____	**46.** 1.18 =	_____	**70.** 0.246 =	_____
23. 0.041 =	_____	**47.** 24.5 =	_____		
24. 0.101 =	_____	**48.** 0.0002 =	_____		

Name Date Period

Workbook Activity
Chapter 4, Lesson 10
63

Fractions to Decimals

EXAMPLE Rename $\frac{2}{3}$ as a decimal.
Round to nearest hundredth.

$$
\begin{array}{r}
.666 \rightarrow 0.67 \\
3\overline{)2.000} \\
-\ 18 \\
\hline
20 \\
-\ 18 \\
\hline
20 \\
-\ 18 \\
\hline
2
\end{array}
$$

Directions Write each fraction as a decimal rounded to the nearest hundredth.

1. $\frac{1}{15}$ = _____
2. $\frac{3}{16}$ = _____
3. $\frac{1}{10}$ = _____
4. $\frac{4}{5}$ = _____
5. $\frac{1}{17}$ = _____
6. $\frac{13}{14}$ = _____
7. $\frac{6}{9}$ = _____
8. $\frac{1}{9}$ = _____
9. $\frac{9}{10}$ = _____
10. $\frac{3}{5}$ = _____
11. $\frac{5}{14}$ = _____
12. $\frac{3}{4}$ = _____
13. $\frac{1}{2}$ = _____
14. $\frac{6}{16}$ = _____
15. $\frac{11}{12}$ = _____

16. $\frac{3}{11}$ = _____
17. $\frac{1}{20}$ = _____
18. $\frac{14}{15}$ = _____
19. $\frac{2}{5}$ = _____
20. $\frac{5}{21}$ = _____
21. $\frac{3}{12}$ = _____
22. $\frac{6}{7}$ = _____
23. $\frac{3}{7}$ = _____
24. $\frac{1}{11}$ = _____
25. $\frac{1}{8}$ = _____
26. $\frac{2}{15}$ = _____
27. $\frac{15}{17}$ = _____
28. $\frac{3}{13}$ = _____
29. $\frac{3}{16}$ = _____
30. $\frac{5}{16}$ = _____

31. $\frac{2}{17}$ = _____
32. $\frac{1}{3}$ = _____
33. $\frac{2}{19}$ = _____
34. $\frac{1}{6}$ = _____
35. $\frac{3}{20}$ = _____
36. $\frac{11}{20}$ = _____
37. $\frac{9}{11}$ = _____
38. $\frac{6}{19}$ = _____
39. $\frac{7}{11}$ = _____
40. $\frac{10}{11}$ = _____
41. $\frac{5}{6}$ = _____
42. $\frac{7}{16}$ = _____
43. $\frac{5}{13}$ = _____
44. $\frac{6}{13}$ = _____
45. $\frac{8}{9}$ = _____

Changing Fractions to Decimals

EXAMPLE Change the fraction to a decimal. Divide to 3 decimal places. Then round to 2 places.

Hint: Try to simplify the fraction before division.

$$\frac{2}{12} = \frac{1}{6} = 6\overline{)1.000} = 0.166 = 0.17$$

Directions Change these fractions to decimals. Divide to 3 places. Then round to 2 places.

1. $\frac{7}{9}$ = _____

2. $\frac{5}{9}$ = _____

3. $\frac{6}{11}$ = _____

4. $\frac{7}{9}$ = _____

5. $\frac{10}{11}$ = _____

6. $\frac{11}{12}$ = _____

7. $\frac{7}{8}$ = _____

8. $\frac{12}{13}$ = _____

9. $\frac{2}{10}$ = _____

10. $\frac{4}{9}$ = _____

11. $\frac{3}{12}$ = _____

12. $\frac{2}{15}$ = _____

13. $\frac{1}{8}$ = _____

14. $\frac{1}{9}$ = _____

15. $\frac{20}{30}$ = _____

16. $\frac{25}{75}$ = _____

17. $\frac{50}{60}$ = _____

18. $\frac{12}{36}$ = _____

19. $\frac{12}{24}$ = _____

20. $\frac{55}{110}$ = _____

21. $\frac{35}{40}$ = _____

22. $\frac{22}{33}$ = _____

23. $\frac{7}{28}$ = _____

24. $\frac{9}{36}$ = _____

25. $\frac{20}{75}$ = _____

26. $\frac{3}{13}$ = _____

27. $\frac{17}{34}$ = _____

28. $\frac{3}{14}$ = _____

29. $\frac{5}{30}$ = _____

30. $\frac{4}{25}$ = _____

Writing Ratios

EXAMPLE Show a ratio in its three forms.

$\frac{1}{2}$ = 1:2 = 1 to 2

Directions Express the ratios using the other two forms.

1. $\frac{4}{3}$ _____

2. 4:7 _____

3. 9 to 12 _____

4. $\frac{5}{8}$ _____

5. 12:16 _____

6. 5 to 15 _____

7. $\frac{9}{3}$ _____

8. $\frac{12}{15}$ _____

9. $\frac{16}{17}$ _____

10. $\frac{22}{11}$ _____

11. 23:80 _____

12. 3 to 7 _____

13. 4 to 9 _____

14. 5 to 18 _____

15. 26:27 _____

16. 32:42 _____

17. $\frac{34}{45}$ _____

18. 2 to 18 _____

19. 33:34 _____

20. $\frac{7}{23}$ _____

Directions Count the number of like symbols and write the ratios for each.

21. Write the ratio of the number of @'s to #'s. _____

22. Write the ratio of the number of @'s to %'s. _____

23. Write the ratio of the number of @'s to $'s. _____

24. Write the ratio of the number of *'s to @'s. _____

25. Write the ratio of the number of #'s to %'s. _____

26. Write the ratio of the number of #'s to *'s. _____

27. Write the ratio of the number of #'s to @'s. _____

28. Write the ratio of the number of *'s to @'s. _____

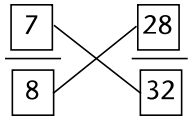
29. Write the ratio of the number of *'s to $'s. _____

30. Write the ratio of the number of %'s to #'s. _____

@ # % $ # * & $ $
# @ $ * & & # @
# @ * & & * * # @
& # @ $ $ $ $ #
@ @ $ % % & * *
& * % % $ # $ %
& * & $ # @ @ #
$ $ % % * & * &
* & * & * * * & $ $
# # @ @ # # * *

Proportions

EXAMPLE Do $\frac{7}{8}$ and $\frac{28}{32}$ form a proportion?



8×28 $\quad$ 7×32
224 $\quad$ 224

The cross products are both 224. The cross products are equal, so the ratios form a proportion.

$\frac{7}{8} = \frac{28}{32}$

Directions Use cross products to decide if the ratios are equal. Write an equal sign (=) if the ratios form a proportion. Write an inequality symbol ($\neq$) if the ratios do not form a proportion.

1. $\frac{1}{3}$ $\frac{4}{12}$

2. $\frac{15}{80}$ $\frac{4}{75}$

3. $\frac{2}{7}$ $\frac{24}{86}$

4. $\frac{108}{18}$ $\frac{18}{3}$

5. $\frac{5}{25}$ $\frac{25}{150}$

6. $\frac{2}{3}$ $\frac{9}{12}$

7. $\frac{10}{16}$ $\frac{5}{8}$

8. $\frac{7}{8}$ $\frac{15}{16}$

9. $\frac{3}{4}$ $\frac{6}{8}$

10. $\frac{5}{16}$ $\frac{25}{86}$

11. $\frac{96}{180}$ $\frac{16}{30}$

12. $\frac{2}{4}$ $\frac{4}{8}$

13. $\frac{4}{32}$ $\frac{16}{64}$

14. $\frac{9}{12}$ $\frac{27}{36}$

15. $\frac{3}{15}$ $\frac{9}{45}$

16. $\frac{72}{54}$ $\frac{9}{7}$

17. $\frac{3}{9}$ $\frac{9}{27}$

18. $\frac{1}{4}$ $\frac{2}{4}$

19. $\frac{1}{3}$ $\frac{5}{6}$

20. $\frac{4}{5}$ $\frac{20}{25}$

21. $\frac{10}{19}$ $\frac{30}{39}$

22. $\frac{3}{6}$ $\frac{5}{10}$

23. $\frac{1}{4}$ $\frac{2}{8}$

24. $\frac{5}{8}$ $\frac{3}{4}$

25. $\frac{2}{7}$ $\frac{24}{84}$

Ratios and Proportions

EXAMPLE 14 books to 2 readers

Write the ratio as a fraction. Simplify if necessary.

$$\frac{14}{2} = \frac{7}{1}$$

Directions Write a ratio to compare each of the following. Simplify to lowest terms.

1. 12 music CD's to 4 tapes

_____

2. 10 automobiles to 13 bikes

_____

3. 24 apples to 8 oranges

_____

4. 125 miles to 5 gallons of gas

_____

5. 22 cats to 33 dogs

_____

6. 24 baseballs to 38 players

_____

7. 14 lb of flour to 7 shoppers

_____

8. 8 students to 18 tables

_____

9. 28 TV's to 56 radios

_____

10. 22 planes to 11 trains

_____

EXAMPLE Cross-multiply. Divide.

$$\frac{72}{n} = \frac{8}{2}$$

$8n = 72 \times 2$ $\quad 8n = 144$ $\quad n = 144 \div 8$

$n = 18$

Directions Solve these proportions using the cross-product method. Express improper fractions as mixed numbers.

11. $\frac{7}{n} = \frac{14}{10}$

12. $\frac{18}{24} = \frac{2}{n}$

13. $\frac{10}{15} = \frac{25}{n}$

14. $\frac{11}{13} = \frac{n}{39}$

15. $\frac{48}{10} = \frac{n}{5}$

Using Proportions

EXAMPLE Cross-multiply. Compare products.

$\overset{30}{\frac{2}{3}} \quad \overset{33}{\frac{11}{15}}$ $\qquad 2 \times 15 = 30 \quad 3 \times 11 = 33$

$\frac{2}{3} < \frac{11}{15}$

Directions Use cross products and use $<$, $>$, or $=$ for each.

1. $\frac{12}{11}$ $\frac{10}{9}$

2. $\frac{7}{10}$ $\frac{20}{32}$

3. $\frac{22}{40}$ $\frac{20}{33}$

4. $\frac{8}{13}$ $\frac{22}{30}$

5. $\frac{8}{9}$ $\frac{13}{15}$

6. $\frac{15}{21}$ $\frac{17}{18}$

Directions Use the cross-product method to solve for the unknown.

7. $\frac{14}{30} = \frac{n}{90}$

8. $\frac{n}{3} = \frac{25}{12}$

9. $\frac{n}{27} = \frac{6}{9}$

10. $\frac{18}{n} = \frac{3}{12}$

11. $\frac{7}{n} = \frac{28}{56}$

12. $\frac{56}{9} = \frac{n}{4}$

Directions Write and solve proportions using the cross-product method. Round your answers to the nearest tenths place.

13. Eldo can ride his bike 15 miles in 2 hours. How many miles can he ride in 7 hours?

14. Lacy can in-line skate 9 miles an hour. How many hours will it take her to do 30 miles?

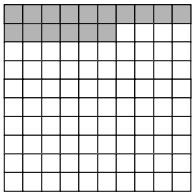
15. Karen and Patrick worked together stringing beads for necklaces. If they can string 50 beads in 9 minutes, how long will it take for them to string 725 beads?

Meaning of Percent

EXAMPLE Shade the boxes to show percent.

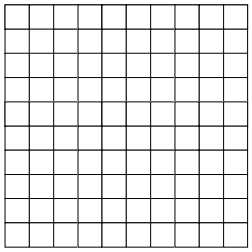
16% = 16 out of 100

Shade 16 boxes.

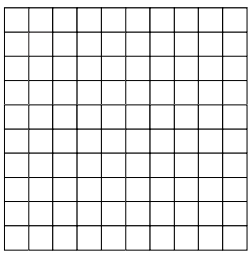


Directions Shade these percents.

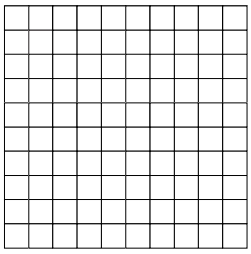
1. 23%



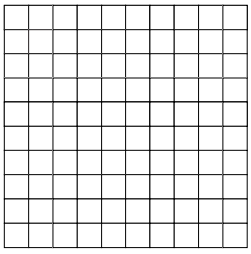
2. 75%



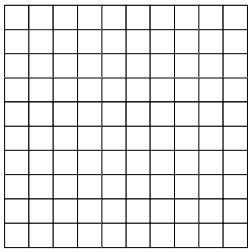
3. 30%



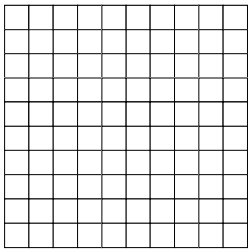
4. 40%



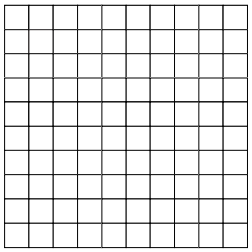
5. 33%



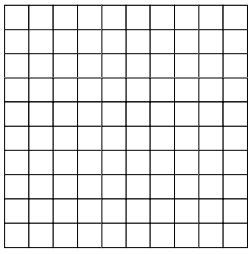
6. 80%



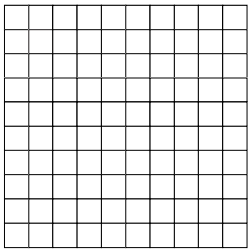
7. 9%



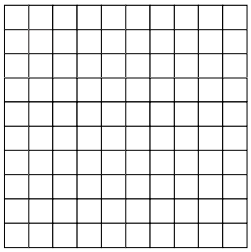
8. 17%



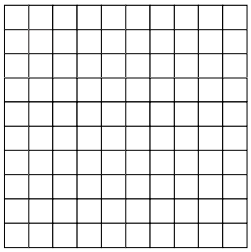
9. 95%



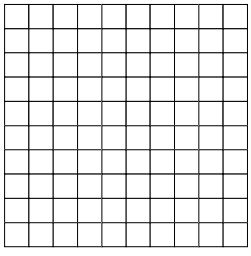
10. 45%



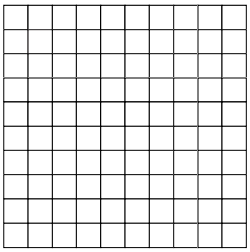
11. 60%



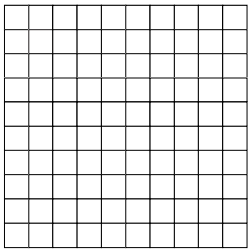
12. 100%



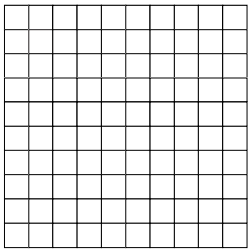
13. 55%



14. 12%



15. 68%



Changing Percents to Decimals and Fractions

EXAMPLES

14% Write as a decimal. Drop percent sign. Add decimal point.
14% = 0.14

14% Write as a fraction. Drop percent sign.
Write number as a numerator over denominator of 100.
Simplify if necessary.
$14\% = \frac{14}{100} = \frac{7}{50}$

Directions Write these percents as decimals.

1. 17% = _____ **7.** 90% = _____ **13.** 39% = _____

2. 33% = _____ **8.** 37% = _____ **14.** 66% = _____

3. 60% = _____ **9.** 55% = _____ **15.** 48% = _____

4. 22% = _____ **10.** 75% = _____ **16.** 34% = _____

5. 41% = _____ **11.** 61% = _____ **17.** 100% = _____

6. 46% = _____ **12.** 80% = _____ **18.** 1% = _____

Directions Write these decimals as fractions. Simplify your answers.

19. 0.37 = _____ **25.** 0.33 = _____ **31.** 0.02 = _____

20. 0.18 = _____ **26.** 0.09 = _____ **32.** 0.88 = _____

21. 0.11 = _____ **27.** 0.40 = _____ **33.** 0.25 = _____

22. 0.05 = _____ **28.** 0.50 = _____ **34.** 0.35 = _____

23. 0.08 = _____ **29.** 0.68 = _____ **35.** 0.90 = _____

24. 0.01 = _____ **30.** 0.10 = _____ **36.** 0.55 = _____

Directions Write these percents as decimals and fractions.
Simplify your answers.

37. 24% = _____ **42.** 72% = _____

38. 30% = _____ **43.** 87% = _____

39. 23% = _____ **44.** 95% = _____

40. 33% = _____ **45.** 74% = _____

41. 70% = _____

Decimals to Percents

EXAMPLE Rename 0.63 as a percent by moving the decimal point two places to the right and adding the percent symbol.

0.63 = 63%

Directions Rewrite each decimal as a percent.

1. 0.36 = _____	**21.** 0.0045 = _____	**41.** 25.0 = _____
2. 1.35 = _____	**22.** 0.6031 = _____	**42.** 3.44 = _____
3. 0.05 = _____	**23.** 5.05 = _____	**43.** 22.332 = _____
4. 0.6 = _____	**24.** 0.2207 = _____	**44.** 5.556 = _____
5. 0.78 = _____	**25.** 0.41 = _____	**45.** 2.33 = _____
6. 0.45 = _____	**26.** 0.2246 = _____	**46.** 0.75 = _____
7. 0.0088 = _____	**27.** 0.032 = _____	**47.** 15.02 = _____
8. 0.035 = _____	**28.** 0.01 = _____	**48.** 0.0062 = _____
9. 0.122 = _____	**29.** 0.1 = _____	**49.** 30.452 = _____
10. 0.02 = _____	**30.** 0.112 = _____	**50.** 73.1 = _____
11. 0.4 = _____	**31.** 0.172 = _____	**51.** 33.4 = _____
12. 0.21 = _____	**32.** 1.75 = _____	**52.** 1.433 = _____
13. 2.09 = _____	**33.** 2 = _____	**53.** 43.14 = _____
14. 2.3 = _____	**34.** 62 = _____	**54.** 12.06 = _____
15. 6.12 = _____	**35.** 4.09 = _____	**55.** 48.045 = _____
16. 4.5 = _____	**36.** 3.1 = _____	**56.** 2.332 = _____
17. 0.065 = _____	**37.** 9.21 = _____	**57.** 2.398 = _____
18. 0.0081 = _____	**38.** 0.155 = _____	**58.** 12.124 = _____
19. 0.205 = _____	**39.** 80.0 = _____	**59.** 42.46 = _____
20. 0.244 = _____	**40.** 7.02 = _____	**60.** 0.0056 = _____

Major Elements of a Percent Sentence

EXAMPLES

	Rate	Base	Percentage
15% of what number is 52?	15%	*n*	52
What percent of 22 is 11?	*n*	22	11

Directions Identify the rate, base, and percentage for the following percent sentences. Use the letter *n* to represent a missing value.

	Rate	Base	Percentage
1. 56% of 90 is what number?			
2. What percent of 50 is 40?			
3. What percent of 86 is 43?			
4. 88% of 50 is what number?			
5. 100% of what number is 176?			
6. 200% of 50 is what number?			
7. 90% of what number is 64?			
8. What percent of 49 is 100?			
9. 70% of 50 is what number?			
10. 80% of 20 is what number?			
11. What percent of 120 is 90?			
12. What percent of 48 is 96?			
13. 150% of what number is 300?			
14. 6% of 33 is what number?			
15. 12% of what number is 70?			
16. What percent of 200 is 300?			
17. What percent of 5 is 30?			
18. 9% of 56 is what number?			
19. 33% of 129 is what number?			
20. 3% of what number is 27?			

Find the Percentage

EXAMPLE 8% of 20 is _____

8% of 20 is n
$0.08 \times 20 = n$
$1.6 = n$

Directions Solve for the percentage.

1. 9% of 50 is _____
2. 4% of 53 is _____
3. 28% of 4 is _____
4. 6% of 125 is _____
5. 2% of 86 is _____
6. 43% of 14 is _____
7. 75% of 92 is _____
8. 21% of 34 is _____
9. 92% of 62 is _____
10. 53% of 80 is _____
11. 15% of 28 is _____
12. 92% of 65 is _____
13. 3% of 2.1 is _____
14. 40% of 3.5 is _____
15. 7% of 0.7 is _____
16. 6% of 2.3 is _____
17. 122% of 42 is _____
18. 136% of 5 is _____
19. 200% of 73 is _____
20. 0.4% of 96 is _____
21. 7.2% of 48 is _____
22. 5.3% of 70 is _____
23. 0.8% of 245 is _____
24. 1.6% of 1.4 is _____
25. 2.8% of 9.02 is _____
26. 2.4% of 76 is _____
27. 5% of 0.083 is _____
28. 0.6% of 435 is _____
29. 0.7% of 7.49 is _____
30. 129% of 4.2 is _____
31. 0.03% of 141 is _____
32. 0.8% of 0.2 is _____
33. 0.82% of 403 is _____
34. 245% of 2.6 is _____
35. 10% of 45 is _____
36. 3.4% of 500 is _____
37. 45% of 100 is _____
38. 23.4% of 300 is _____
39. 140% of 62 is _____
40. 7% of 250 is _____
41. 0.46% of 746 is _____
42. 6.5% of 30 is _____
43. 7.9% of 500 is _____
44. 200% of 0.33 is _____
45. 9% of 9 is _____

Find the Base

EXAMPLE

5% of _____ is 1.4

5% of n is 1.4

$0.05 \times n = 1.4$

$n = 1.4 \div 0.05$

$n = 28$

$$0.5\overline{)1.40} \quad 28$$

$-\ 1\ 0$

40

$-\ 40$

Directions Solve for the base.

1. 5% of _____ is 4.1

2. 2% of _____ is 3.6

3. 6% of _____ is 1.8

4. 3% of _____ is 0.27

5. 7% of _____ is 0.196

6. 4% of _____ is 1.28

7. 50% of _____ is 2.7

8. 35% of _____ is 30.8

9. 6% of _____ is 0.078

10. 8% of _____ is 0.32

11. 2.5% of _____ is 0.15

12. 7.3% of _____ is 2.044

13. 120% of _____ is 50.4

14. 3.4% of _____ is 2.38

15. 9% of _____ is 0.315

16. 5% of _____ is 0.13

17. 5% of _____ is 0.0235

18. 41% of _____ is 0.82

19. 3% of _____ is 0.045

20. 245% of _____ is 191.1

21. 9% of _____ is 0.0594

22. 0.3% of _____ is 0.135

23. 0.75% of _____ is 0.9

24. 0.8% of _____ is 0.4

25. 4% of _____ is 0.0176

26. 0.21% of _____ is 0.0735

27. 150% of _____ is 135

28. 125% of _____ is 62.5

29. 5.2% of _____ is 0.0988

30. 3.4% of _____ is 0.3094

31. 0.5% of _____ is 1.19

32. 0.21% of _____ is 0.0147

33. 0.32% of _____ is 0.32

34. 0.75% of _____ is 7.5

35. 8% of _____ is 0.416

36. 1.4% of _____ is 0.196

37. 6% of _____ is 0.138

38. 5% of _____ is 0.115

39. 120% of _____ is 102

40. 1% of _____ is 0.03

41. 0.9% of _____ is 1.35

42. 6.3% of _____ is 0.252

43. 8% of _____ is 16

44. 4% of _____ is 0.024

45. 1.6% of _____ is 3.376

Find the Rate

EXAMPLE _____% of 80 is 4.8

n% of 80 is 4.8
$n \times 0.80 = 4.8$
$n = 4.8 \div 0.80$
$n = 6\%$

$$0.80\overline{)4.8} \quad \begin{array}{r} 6 \\ -\,4\,8 \\ \hline 0 \end{array}$$

or

$n \times 80 = 4.8$
$n = \frac{4.8}{80}$
$n = 0.06 = 6\%$

Directions Solve for the rate.

1. _____ % of 25 is 5
2. _____ % of 35 is 1.05
3. _____ % of 70 is 3.5
4. _____ % of 30 is 1.8
5. _____ % of 80 is 5.6
6. _____ % of 20 is 1.8
7. _____ % of 80 is 0.56
8. _____ % of 200 is 102
9. _____ % of 20 is 7
10. _____ % of 300 is 45
11. _____ % of 100 is 9
12. _____ % of 2,000 is 360
13. _____ % of 35 is 2.8
14. _____ % of 305 is 48.8
15. _____ % of 20 is 30
16. _____ % of 64 is 112
17. _____ % of 10.5 is 0.84
18. _____ % of 250 is 70
19. _____ % of 38 is 1.14
20. _____ % of 72 is 1.08
21. _____ % of 206 is 16.48
22. _____ % of 500 is 4.5
23. _____ % of 2.06 is 0.1442
24. _____ % of 600 is 420
25. _____ % of 700 is 9.8
26. _____ % of 40 is 0.32
27. _____ % of 200 is 0.14
28. _____ % of 3,000 is 1.8
29. _____ % of 2.5 is 0.9
30. _____ % of 4.2 is 0.546
31. _____ % of 4 is 0.12
32. _____ % of 400 is 0.08
33. _____ % of 22 is 56.1
34. _____ % of 30 is 106.5
35. _____ % of 80 is 14
36. _____ % of 15 is 0.56
37. _____ % of 90 is 5.4
38. _____ % of 50 is 100
39. _____ % of 23 is 2.3
40. _____ % of 120 is 300
41. _____ % of 22 is 0.33
42. _____ % of 30 is 2.85
43. _____ % of 70 is 4.9
44. _____ % of 0.16 is 0.000136
45. _____ % of 50 is 9

Percent Sentences

EXAMPLES

Percentage	Base	Rate
25% of 80 is _____	*25*% of _____ is 52	_____% of 44 is 11
25% × 80 = *n*	25% × *n* = 52	*n*% × 44 = 11
0.25 × 80 = 20	0.25*n* = 52	*n* × 0.44 = 11
	n = 208	*n* = 11 ÷ 0.44
		n = 25%

Directions Solve for the percentage.

1. 25% of 60 is _____

2. 82% of 50 is _____

3. 90% of 60 is _____

4. 35% of 36 is _____

5. 92% of 100 is _____

6. 20% of 30 is _____

Directions Solve for the base.

7. 15% of _____ is 9

8. 60% of _____ is 15

9. 20% of _____ is 8

10. 62% of _____ is 10.54

11. 53% of _____ is 106

12. 92% of _____ is 23

Directions Solve for the rate.

13. _____ % of 9.5 is 7.6

14. _____ % of 70 is 21

15. _____ % of 45 is 4.05

16. _____ % of 30 is 21

17. _____ % of 80 is 72

18. _____ % of 26 is 0.65

Directions Complete each percent sentence.

19. _____ % of 2.5 is 0.375

20. 5.5% of _____ is 0.2475

21. 0.5% of 75 is _____

22. 2.8% of _____ is 18.2

23. _____ % of 240 is 192

24. 75% of _____ is 225

25. 10% of _____ is 0.26

Using Proportions

EXAMPLES

Find base.

25% of n is 17.5

$$\frac{25}{100} = \frac{17.5}{n}$$
$$100 \times 17.5 = 25n$$
$$1{,}750 = 25n$$
$$\frac{1{,}750}{25} = \frac{25n}{25}$$
$$70 = n$$

Find rate.

n% of 40 is 24

$$\frac{n}{100} = \frac{24}{40}$$
$$100 \times 24 = 40n$$
$$2{,}400 = 40n$$
$$\frac{2{,}400}{40} = \frac{40n}{40}$$
$$60 = n$$

Find percentage.

7% of 80 is n

$$\frac{7}{100} = \frac{n}{80}$$
$$100n = 7 \times 80$$
$$100n = 560$$
$$\frac{100n}{100} = \frac{560}{100}$$
$$n = 5.6$$

Directions Write proportions and solve for the unknown.

1. 20% of n is 9.6 _____

2. n% of 35 is 5.6 _____

3. 70% of 32 is n _____

4. 30% of n is 120 _____

5. n% of 50 is 11.5 _____

6. 85% of 36 is n _____

7. 90% of n is 270 _____

8. n% of 97 is 48.5 _____

9. 80% of 40 is n _____

10. 23% of n is 73.6 _____

11. n% of 60 is 24 _____

12. 35% of n is 24.5 _____

13. 18% of 350 is n _____

14. n% of 29 is 2.03 _____

15. 9% of n is 4.68 _____

Discount

EXAMPLES Find the sale price of a music CD that lists for $18.50, if the discount rate is 20%.

Step 1
$18.50 list price
× .20
$3.70 discount

Step 2
$18.50 list price
− 3.70 discount
$14.80 price after discount

Find the discount rate if a $25.00 DVD is on sale for $21.25.

Step 1
$25.00 list price
− 21.25 discount price
$3.75 discount

.15 = 15% discount rate
25)3.75
− 25
125
− 125

Directions Solve these discount problems. When necessary round answers to the nearest cent.

1. $175.00 list price
10% discount rate
Discount _____
Sale price _____

2. $80.00 list price
20% discount rate
Discount _____
Sale price _____

3. CD list price $22.00
15% discount rate
Discount _____
Sale price _____

4. Videotape list price $50.00
Sale price $20.00
Discount _____
Discount rate _____

5. Computer list price $950.00
Discount rate 10%
Discount _____
Sale price _____

6. Radio list price $75.00
Discount rate 15%
Discount _____
Sale price _____

7. Stereo list price $150.00
Sale price $120.00
Discount _____
Discount rate _____

8. Disk drive list price $150.00
Discount rate 20%
Discount _____
Sale price _____

9. Television list price $395.00
Discount rate 10%
Discount _____
Sale price _____

10. Jeans list price $34.95
Discount rate 10%
Discount _____
Sale price _____

Sales Tax

EXAMPLE Compute 6% sales tax on $13.05

$13.05 cost before tax
× .06 tax rate
0.7830
0.79 ← Tax **always** rounds up.
The tax is $0.79 or 79 cents.

Directions Compute sales tax.

1. $2.75 at 5% _____

2. $6.15 at 7% _____

3. $24.95 at 7% _____

4. $120.00 at 5% _____

5. $1,200.00 at 6% _____

6. $16.75 at 6% _____

7. $100.00 at 6% _____

8. $30.10 at 7% _____

9. $0.45 at 5% _____

Directions Compute sales tax and total cost.

10. A book for $17.95
6% tax rate
Tax _____
Cost plus tax _____

11. Clock for $75.00
5% tax rate
Tax _____
Cost plus tax _____

12. Television for $299.99
7% tax rate
Tax _____
Cost plus tax _____

13. Table for $98.00
5% tax rate
Tax _____
Cost plus tax _____

14. Used car for $11,960.00
6% tax rate
Tax _____
Cost plus tax _____

15. Electric stove for $699.00
5% tax rate
Tax _____
Cost plus tax _____

Simple Interest

EXAMPLE Compute the simple interest on a principal of \$125.00 at an interest rate of 7% for 3 years.

\$125.00 principal
× .07
\$8.7500 interest for one year

\$8.75 interest for one year
× 3 for 3 years
\$26.25 interest for 3 years

Compute the simple interest on \$200.00 at a rate of 6% for 9 months.

\$200.00 principal
× .06
\$12.00 interest for 1 year

$\frac{\$12}{1} \times \frac{9}{12}$ ← Write 9 months over 12 months to express time as years.

$\frac{12}{1} \times \frac{3}{4} = \frac{36}{4} = 9$

\$9.00 is the interest for 9 months.

Directions Compute the simple interest.

1. Compute the simple interest for \$750.00 at 7% for 5 years. _____

2. Compute the simple interest for \$800.00 at 6% for 6 months. _____

3. Compute the simple interest for \$1,200.00 at 9% for 10 years. _____

4. Compute the simple interest for \$5,000.00 at 10% for 5 years. _____

5. Compute the simple interest for \$6,200.00 at 8% for 10 years. _____

6. Compute the simple interest for \$150.00 at 5% for 11 years. _____

7. Compute the simple interest for \$48.00 at 5% for 6 months. _____

8. Compute the simple interest for \$4,500.00 at 7% for 9 months. _____

9. Compute the simple interest for \$395.00 at 3% for 24 months. _____

10. Compute the simple interest for \$245.00 at 5% for 7 years. _____

Installment Buying

EXAMPLE Find the finance charge and balance with a 2% finance rate for $400.00.

Step 1
$400.00 previous balance
× .02 finance rate
$8.0000 finance charge

Step 2
$400.00 previous balance
+ 8.00 finance charge
$408.00

New balance before first payment

Step 3
$408.00
− 25.00 first month's payment
$383.00 new balance

Directions Complete the installment chart for a TV that cost $400.00. The monthly payments will be $25.00 and a 2% finance charge will be added to the unpaid balance.

Month	Previous Balance	Finance Charge	Before Payment	Monthly Payment	New Balance
June	$400.00	$8.00	$408.00	$25.00	$383.00
July	$383.00				
August					
September					
October					

Directions Complete the installment chart for a TV that cost $400.00 with a 1% finance charge added to the unpaid balance. The monthly payments are $25.00.

Month	Previous Balance	Finance Charge	Before Payment	Monthly Payment	New Balance
June					
July					
August					
September					
October					

Commission

EXAMPLE Compute the commission for a real estate agent who sells a house for $95,000 and the commission rate is 3%.

$95,000.00 sale price
× .03 commission rate
$2,850.00 commission

Directions Compute the following sales commissions.

1. Amount is $4,500.00
Commission rate 5%
Commission _____

2. Amount is $48,000.00
Commission rate 3%
Commission _____

3. Amount is $3,400.00
Commission rate 3%
Commission _____

4. Amount is $500.00
Commission rate 5%
Commission _____

5. Amount is $1,000.00
Commission rate 3%
Commission _____

6. Amount is $1,600.00
Commission rate 3%
Commission _____

7. Amount is $450.00
Commission rate 5%
Commission _____

8. Amount is $1,700.00
Commission rate 4%
Commission _____

9. Amount is $3,400.00
Commission rate 5%
Commission _____

10. Amount is $950.00
Commission rate 10%
Commission _____

11. Amount is $560.00
Commission rate 5%
Commission _____

12. Amount is $880.00
Commission rate 4%
Commission _____

13. Amount is $234.00
Commission rate 11%
Commission _____

14. Amount is $911.00
Commission rate 4%
Commission _____

15. Amount is $260.00
Commission rate 9%
Commission _____

Tips

EXAMPLE Compute a 15% tip on a meal that costs $23.50.

$23.50 meal cost
× .15 tip rate
11750
2350
$3.5250 round to nearest cent

$3.53 rounded to nearest cent

$23.50 meal cost
× 3.53 tip
$27.03 total

Directions Compute the tip for each meal. Use 15% as a tip rate for each meal.

1. Meal cost $20.00
Tip _____
Meal total _____

2. Meal cost $27.20
Tip _____
Meal total _____

3. Meal cost $37.00
Tip _____
Meal total _____

4. Meal cost $25.00
Tip _____
Meal total _____

5. Meal cost $45.20
Tip _____
Meal total _____

6. Meal cost $18.00
Tip _____
Meal total _____

7. Meal cost $5.50
Tip _____
Meal total _____

8. Meal cost $11.90
Tip _____
Meal total _____

9. Meal cost $4.50
Tip _____
Meal total _____

Directions Compute the tip for each meal and round to the nearest dollar.

10. Meal cost $4.60
Tip _____
Meal total _____

11. Meal cost $15.50
Tip _____
Meal total _____

12. Meal cost $11.90
Tip _____
Meal total _____

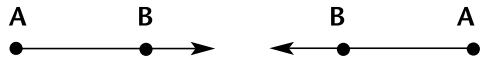
13. Meal cost $14.70
Tip _____
Meal total _____

14. Meal cost $5.50
Tip _____
Meal total _____

15. Meal cost $7.95
Tip _____
Meal total _____

Points, Lines, and Angles

EXAMPLE Make a construction to represent $\overrightarrow{AB}$.



Rays can be drawn from either direction.
The beginning point must be *A* as indicated $\overrightarrow{AB}$.

Directions Use the baseline provided to construct the following geometric constructions.

1. $\overrightarrow{BA}$ _____

2. $\angle ABC$ _____

3. $\angle XYZ$ _____

4. $\overrightarrow{AD}$ _____

5. $\overline{DZ}$ _____

6. Vertex *G* _____

7. Vertex *H* _____

8. $\overleftrightarrow{RT}$ _____

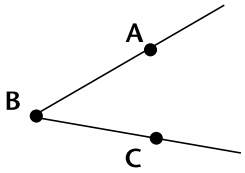
9. point *B* _____

10. $\angle QRS$ _____

Identifying Angles

EXAMPLE Construct an acute angle.

$\angle ABC$ is acute because $\angle B$ is less than 90 degrees.



Directions Construct these angles on the baselines given.

1. acute

2. straight

3. obtuse

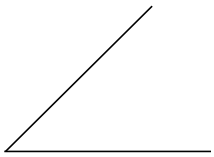
4. reflex

5. right

Measuring Angles

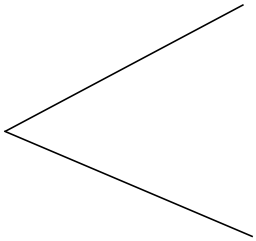
EXAMPLE Place protractor on the angle so that the center is on the angle's vertex and the baseline is on one of the rays.

Make sure second ray crosses the scale. Read the scale.



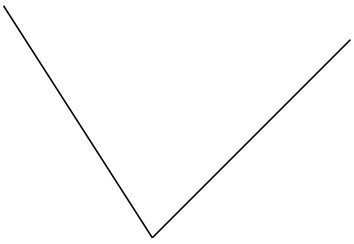
45°

Directions Use a protractor to measure these angles to the nearest degree. If necessary, use a straightedge to extend the sides of the angle.

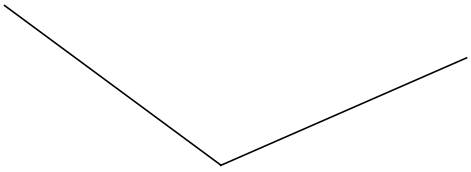


1. _____

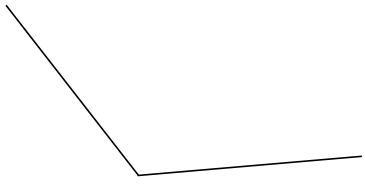
4. _____



2. _____



5. _____



3. _____

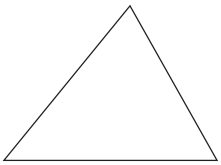
Polygons

EXAMPLE Count the number of sides. Name the polygon.

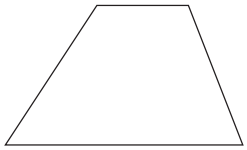
quadrilateral

Directions Count the number of sides for each polygon. Use the chart to classify each polygon.

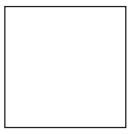
1.



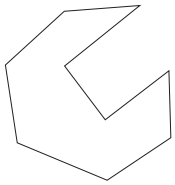
2.



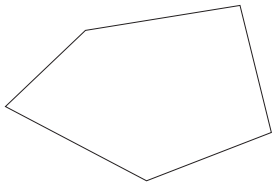
3.



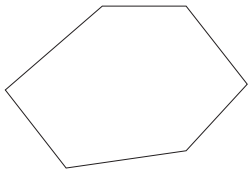
4.



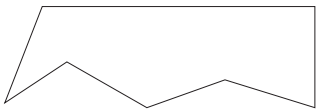
5.



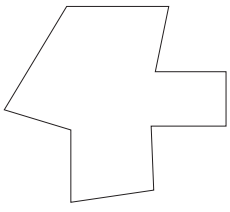
6.



7.

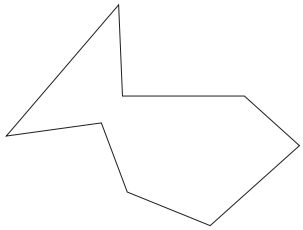


8.

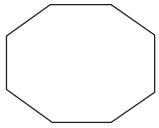


Number of Sides	Name of Polygon
3	triangle
4	quadrilateral
5	pentagon
6	hexagon
7	heptagon
8	octagon
9	nonagon
10	decagon
12	dodecagon

9.

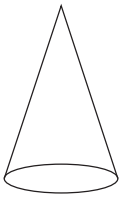


10.



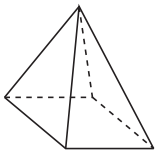
Solid Figures

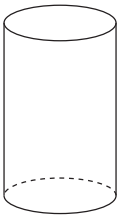
EXAMPLE Look at the solid figure. Identify it.

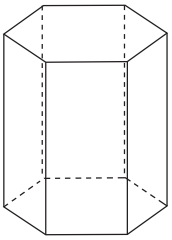


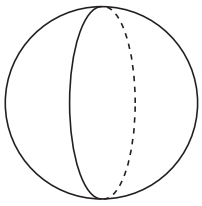
cone

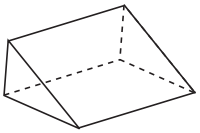
Directions Identify these solid figures.

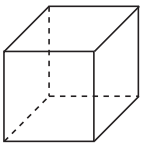
1. 

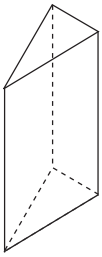
2. 

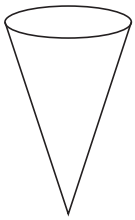
3. 

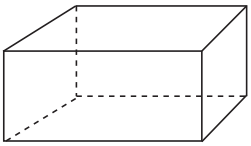
4. 

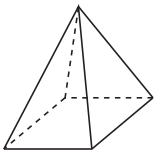
5. 

6. 

7. 

8. 

9. 

10. 

Units of Measurement

EXAMPLE Circle the letter of the best answer. Think about the meaning of the prefix. Convert from one unit of measurement to the other.

4 centimeters

A 0.004 meter
B 0.04 meter
C 0.40 meter
D 4 meter

Centi means one-hundredth. 4 centimeters is 4 one-hundredths, or 0.04, meters.

Directions Circle the letter of the best answer.

1. 3 millimeters
A 3 meters
B 30 meters
C 0.03 meters
D 0.003 meters

2. 7 kilometers
A 70 meters
B 700 meters
C 7,000 meters
D 0.007 meters

Prefix	Value	Symbol	Example
kilo	one thousand	k	kilometer
hecto	one hundred	h	hectometer
deka	ten	da	dekagram
deci	one-tenth	d	decimeter
centi	one-hundredth	c	centigram
milli	one-thousandth	m	milliliter

Sometimes **deka** is spelled **deca**.

3. 8 centimeters
A 0.08 meters
B 0.8 meters
C 80 meters
D 8 meters

4. 9 dekameters
A 9 meters
B 90 meters
C 0.09 meters
D 900 meters

5. 4 hectometers
A 40 meters
B 0.04 meters
C 0.004 meters
D 400 meters

6. 3 decimeters
A 3 meters
B 0.3 meters
C 0.03 meters
D 30 meters

7. 19 kilometers
A 190 meters
B 0.0019 meters
C 1,900 meters
D 19,000 meters

8. 27 centimeters
A 2.7 meters
B 0.27 meters
C 0.027 meters
D 27 meters

9. 7 decimeters
A 0.7 meters
B 0.07 meters
C 70 meters
D 700 meters

10. 3,000 millimeters
A 300 meters
B 30 meters
C 3 meters
D 0.03 meters

Using the Metric System

EXAMPLE Use a metric ruler to measure the line to the nearest millimeter.
Give your answer in centimeters and millimeters.

7 cm 4 mm

Directions Measure these line segments using the metric system.
Measure to the nearest millimeter. Write your answers on the line.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

Converting Units

EXAMPLES

4.5 m = 450 cm
2 places →

km 3 m 2 cm 1 mm
→

6.2 cm = 0.000062 km
← 5 places

km 3 m 2 cm 1 mm
←

The decimal has moved 5 places to the left. Also note that the arrow has moved under the 2 and the 3. 2 + 3 = 5
Move the decimal 5 places in the direction of the arrow.

Directions Make the following conversions.

1 kilometer = 1,000 meters
1 meter = 100 centimeters
1 meter = 1,000 millimeters
1 centimeter = 10 millimeters

1. 5 m = _____ mm

2. 2 cm = _____ mm

3. 12 km = _____ m

4. 9 cm = _____ m

5. 2.3 cm = _____ m

6. 3.44 km = _____ cm

7. 19 mm = _____ cm

8. 7.1 cm = _____ km

9. 2 cm = _____ m

10. 0.04 km = _____ m

11. 29,000 mm = _____ m

12. 9,000,000 mm = _____ km

13. 0.0003 cm = _____ km

14. 0.004 cm = _____ mm

15. 82 mm = _____ m

Working with Measurements of Length

EXAMPLE Add. Convert meters to centimeters.

2 m + 350 cm

200 m + 350 cm = 550 cm

Directions Use the charts to help make these conversions.

km _3_ m _2_ cm _1_ mm

1 kilometer = 1,000 meters
1 meter = 100 centimeters
1 meter = 1,000 millimeters
1 centimeter = 10 millimeters

1. 234 mm = _____ cm

2. 82 m = _____ km

3. 3.4 mm = _____ m

4. 5 km = _____ cm

5. 35 cm = _____ mm

6. 87 mm = _____ km

7. 3.2 cm = _____ mm

8. 0.24 km = _____ m

9. 0.7 mm = _____ cm

10. 0.001 km = _____ m

11. 15 cm = _____ m

12. 0.02 m = _____ cm

Directions Find the answers to these addition problems.

13. 34 cm + 4.9 cm + 7 cm = _____ cm

14. 9 mm + 22 mm = _____ mm

15. 66 m + 120 cm + 10 m = _____ m

16. 4 km + 5 m + 120 cm = _____ m

17. 3.4 cm + 12 mm + 4 mm = _____ mm

18. 2 km + 23 m + 300 cm = _____ m

19. 4 m + 34 m + 0.005 km = _____ m

20. 1 cm + 1 m = _____ m

21. 9 mm + 30 mm + 1.1 cm = _____ mm

22. 8 km + 2,031 m = _____ km

23. 30 m + 20 cm = _____ km

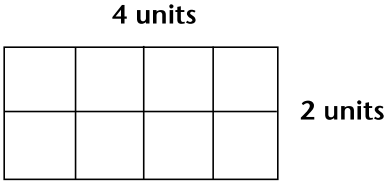
24. 0.003 km + 2 m = _____ cm

25. 4 mm + 30 cm = _____ mm

Computing Area of a Rectangle

EXAMPLE

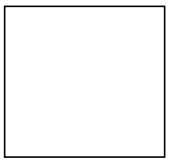
Area = length × width
Area = 4 units × 2 units
Area = 8 square units



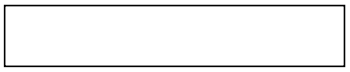
Directions Solve for the area of these rectangles.

1.

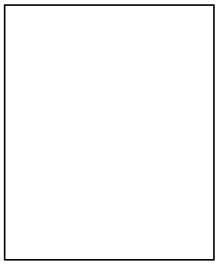
2.



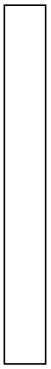
3.



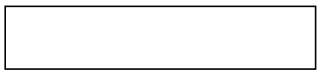
4.



5.

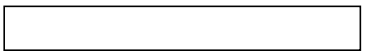


6.

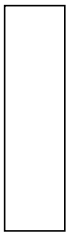


7.

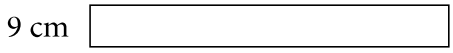
8.



9.



10.



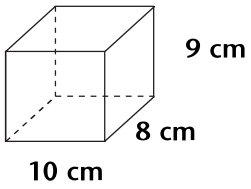
Computing Volume

EXAMPLE Compute the volume for this rectangular prism.

Volume = length × width × height

Volume = 10 cm × 8 cm × 9 cm

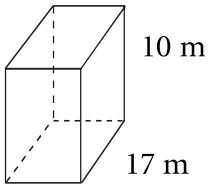
Volume = 720 cubic cm



All volume measurements are expressed in cubic units.

Directions Compute the volumes.

1.



_____

2. length = 1 km
width = 2 km
height = 5 km

_____

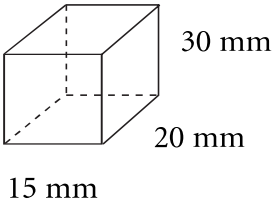
3. length = 13 cm
width = 8 cm
height = 20 cm

_____

4. length = 22 km
width = 22 km
height = 10 km

_____

5.



_____

6. length = 12 cm
width = 20 cm
height = 6 cm

_____

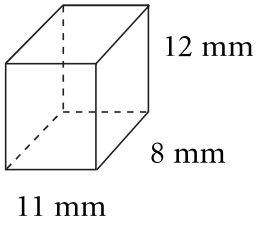
7. length = 100 m
width = 100 m
height = 10 m

_____

8. length = 25 km
width = 20 km
height = 40 km

_____

9.



_____

10. length = 45 cm
width = 17 cm
height = 10 cm

_____

Capacity

EXAMPLE Capacity is the amount a container will hold when full.

Liter is L. The L is always capitalized in abbreviations.

Centiliter is cL, kiloliter is kL, and milliliter is mL.

15 L = _____ cL

1 L = 100 cL, so

15 L = 1,500 cL

1 kiloliter = 1,000 liters
1 liter = 100 centiliters
1 centiliter = 10 milliliters

Directions Choose the proper unit of measure for each of these examples.

1. a large container of milk

_____

2. the amount of water in a swimming pool

_____

3. the amount of cream in a bowl

_____

4. milk shake in a paper cup

_____

5. trunk space of a large car

_____

6. automobile gas tank

_____

7. the amount of salt needed

_____

8. a bottle of perfume

_____

9. a thimble full of water

_____

10. a bathtub full of water

_____

Directions Make these conversions using the table.

11. 2 kiloliters = _____ liters

12. 2,000 liters = _____ kiloliters

13. 300 milliliters = _____ cL

14. 400 mL = _____ liters

15. 9 kL = _____ L

16. 200 centiliters = _____ milliliters

17. 1 kL = _____ L

18. 30 mL = _____ centiliters

19. 10 L = _____ cL

20. 40 cL = _____ mL

Units of Capacity

EXAMPLE kL 3 L 2 cL 1 mL

2,200 mL = _____ L

1,000 mL = 1 L, so

2,200 mL = 2.2 L

1 kiloliter = 1,000 liters
1 liter = 100 centiliters
1 centiliter = 10 milliliters
1 liter = 1,000 milliliters

Directions Use these charts to help determine the correct conversion.

1. 4,500 mL = _____ L

2. 0.00012 kL = _____ L

3. 2.3 L = _____ mL

4. 3.6 L = _____ kL

5. 0.091 mL = _____ cL

6. 7 mL = _____ L

Directions Solve for the volumes.

7. length = 2 mm
width = 3 mm
height = 4 mm
volume = _____ mm^3

8. length = 8 cm
width = 5 cm
height = 9 cm
volume = _____ cm^3

9. length = 12 m
width = 4 m
height = 1 m
volume = _____ m^3

10. length = 1 m
width = 1 m
height = 50 cm
volume = _____ cm^3

11. length = 4 mm
width = 20 mm
height = 1 cm
volume = _____ mm^3

12. length = 2.3 cm
width = 100 cm
height = 20 mm
volume = _____ cm^3

13. length = 3 km
width = 10 km
height = 1 km
volume = _____ km^3

14. length = 90 cm
width = 300 cm
height = 1 m
volume = _____ cm^3

15. length = 45 mm
width = 2 cm
height = 20 cm
volume = _____ cm^3

Mass

EXAMPLE Circle the best measurement.

a bag of flour

mg g (kg)

A bag of flour weighs more than 1,000 grams, so use kilograms to measure its mass.

Directions Choose the best measurement for each of these items. Circle your answer.

1. a pencil
mg g kg

2. a grape
mg g kg

3. a sunflower seed
mg g kg

4. a small child
mg g kg

5. an automobile
mg g kg

6. a soup bowl
mg g kg

7. a textbook
mg g kg

8. a tube of toothpaste
mg g kg

9. a box of cereal
mg g kg

10. an apple
mg g kg

11. a toothpick
mg g kg

12. one large steak
mg g kg

13. a large cow
mg g kg

14. a small cow
mg g kg

15. a sheep
mg g kg

16. a 17-inch TV
mg g kg

17. a sandwich
mg g kg

18. a tomato
mg g kg

19. a can of soup
mg g kg

20. a kitchen table
mg g kg

21. a large turkey
mg g kg

22. a ballpoint pen
mg g kg

23. a plate full of chicken
mg g kg

24. one large shoe
mg g kg

25. one carrot
mg g kg

26. an egg sandwich
mg g kg

27. a bike
mg g kg

28. one peanut
mg g kg

29. one grain of salt
mg g kg

30. a train
mg g kg

Working with Units of Mass

EXAMPLE 3,400 grams _____ kilograms

kg _3_ g _2_ cg _1_ mg

Step 1 Draw a line from g to kg.

Step 2 The line moves to the left as it passes the 3.

3,400 grams Move the decimal 3 places to the left.

3,400 grams _3.4_ kilograms

Directions Use the chart to help make the conversions.

1 kilogram = 1,000 grams
1 gram = 100 centigrams
1 centigram = 10 milligrams
1 gram = 1,000 milligrams

1. 23 mg = _____ g

2. 31 mg = _____ g

3. 32 g = _____ kg

4. 120 cg = _____ g

5. 13 kg = _____ cg

6. 350 kg = _____ g

7. 100 mg = _____ g

8. 300 mg = _____ cg

9. 240 cg = _____ g

10. 1 kg = _____ cg

11. 1,000 cg = _____ g

12. 300 g = _____ kg

13. 20 g = _____ cg

14. 50 mg = _____ kg

15. 1,500 g = _____ kg

Liquid Capacity

EXAMPLES If necessary, change the units to intermediate units first.

10 quarts = _____ fluid ounces
Write this:
10 quarts = __20__ pints = __320__ fluid ounces

6 pints = __96__ fluid ounces

Multiply. 6 × 16 = 96

Commonly Used Measurements
1 pint = 16 fluid ounces
1 quart = 2 pints
1 quart = 32 fluid ounces
1 gallon = 4 quarts

Directions Make these conversions. Multiply when you are converting from large to smaller units.

1. 2 quarts = _____ pints

2. 4 quarts = _____ pints

3. 4 gallons = _____ quarts

4. 3 pints = _____ fluid ounces

5. 5 quarts = _____ pints

6. 2 gallons = _____ quarts

7. 5 pints = _____ fluid ounces

8. 10 gallons = _____ quarts

9. 20 quarts = _____ pints

10. 13 quarts = _____ pints

11. 20 quarts = _____ fluid ounces

12. 3 gallons = _____ pints

13. 4 quarts = _____ fluid ounces

Directions Make these conversions. Divide when you are converting from small to larger units. If necessary express answers as mixed numbers.

14. 40 pints = _____ quarts

15. 14 quarts = _____ gallons

16. 48 fluid ounces = _____ pints

17. 22 pints = _____ quarts

18. 32 pints = _____ quarts

19. 30 quarts = _____ gallons

20. 12 pints = _____ quarts

21. 34 quarts = _____ gallons

22. 45 fluid ounces = _____ pints

23. 80 quarts = _____ gallons

24. 56 fluid ounces = _____ pints

25. 23 pints = _____ quarts

Converting Units of Weight

EXAMPLES Multiply or divide to convert units.

2 tons = _____ pounds

2 × 2,000 = 4,000 pounds

3,000 pounds = _____ tons

3,000 ÷ 2,000 = $1\frac{1}{2}$ tons

Commonly Used Measurements
1 pound = 16 ounces
1 ton = 2,000 pounds

Directions Multiply to convert large units to smaller units.

1. 3 tons = _____ pounds

2. 5.5 pounds = _____ ounces

3. 10 pounds = _____ ounces

4. 7 tons = _____ pounds

5. 7 pounds = _____ ounces

6. 4.5 tons = _____ pounds

7. 2.5 pounds = _____ ounces

8. 32 pounds = _____ ounces

9. 5 tons = _____ ounces

10. 11 pounds = _____ ounces

11. 15 tons = _____ pounds

12. 2.5 pounds = _____ ounces

13. 1.5 pounds = _____ ounces

14. 1.5 tons = _____ pounds

Directions Divide to convert small units to larger units. Some remainders may be expressed as fractions.

15. 40,000 pounds = _____ tons

16. 48 ounces = _____ pounds

17. 64,000 ounces = _____ pounds

18. 32 ounces = _____ pounds

19. 21,000 pounds = _____ tons

20. 550 ounces = _____ pounds

21. 100 ounces = _____ pounds

22. 4,500 pounds = _____ tons

23. 35,000 pounds = _____ tons

24. 4,600 pounds = _____ tons

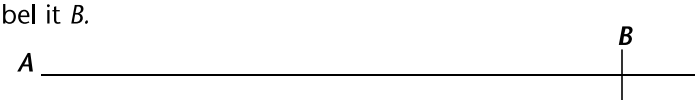
25. 8,800 pounds = _____ tons

Measuring Lengths

EXAMPLE Use a ruler to measure the length.

Draw a vertical rule. Label it *B*.

$\overline{AB}$ = 3 inches



Directions Use a ruler to mark the following measurements. Begin the measured line with point *A* ending with point *B*.

1. $\overline{AB} = 2$ inches *A* _____

2. $\overline{AB} = 3.5$ inches *A* _____

3. $\overline{AB} = 2\frac{1}{2}$ inches *A* _____

4. $\overline{AB} = 4$ inches *A* _____

5. $\overline{AB} = 2\frac{1}{8}$ inches *A* _____

6. $\overline{AB} = 3\frac{1}{4}$ inches *A* _____

7. $\overline{AB} = 3.75$ inches *A* _____

8. $\overline{AB} = 1\frac{1}{4}$ inches *A* _____

9. $\overline{AB} = 1\frac{1}{2}$ inches *A* _____

10. $\overline{AB} = 1\frac{7}{8}$ inches *A* _____

11. $\overline{AB} = 2\frac{4}{8}$ inches *A* _____

12. $\overline{AB} = 1\frac{15}{16}$ inches *A* _____

13. $\overline{AB} = 4.5$ inches *A* _____

14. $\overline{AB} = 2\frac{5}{8}$ inches *A* _____

Directions Measure the lengths of these lines to the nearest $\frac{1}{4}$ inch.

15. _____

16. _____

17. _____

18. _____

19. _____

20. _____

Length and Distances

EXAMPLES Use the chart below to make conversions.

4 feet = _____ inches

$4 \times 12 = 48$

12 inches = 1 foot

4 feet = 48 inches

120 inches = _____ feet

$120 \div 12 = 10$

12 inches = 1 foot

120 inches = 10 feet

Directions Use the chart and multiply to make these conversions.

1 foot = 12 inches
1 yard = 36 inches
1 yard = 3 feet
1 mile = 5,280 feet

1. 5 feet = _____ inches

2. 5 yards = _____ feet

3. 2 miles = _____ feet

4. 8 feet = _____ inches

5. 4 yards = _____ inches

6. 56 yards = _____ feet

7. 9 feet = _____ inches

8. 7 miles = _____ inches

9. 20 feet = _____ inches

10. 7 feet = _____ inches

11. 36 yards = _____ inches

12. 10 miles = _____ feet

Directions Use the chart and divide to make these conversions. Express any remainders as fractions.

13. 180 inches = _____ feet

14. 38 inches = _____ feet

15. 96 inches = _____ feet

16. 39 inches = _____ feet

17. 50 inches = _____ feet

18. 52 feet = _____ yards

19. 15,840 feet = _____ miles

20. 75 feet = _____ yards

21. 21,120 feet = _____ miles

22. 300 feet = _____ yards

23. 6,000 feet = _____ miles

24. 192 inches = _____ feet

25. 288 inches = _____ yards

Operations with Linear Measurements

EXAMPLES

Add.

3 feet 5 inches
+ 7 feet 9 inches
10 feet 14 inches
or
11 feet 2 inches

Subtract.

$\cancel{6}^{5}$ feet $\cancel{5}^{17}$ inches
− 2 feet 9 inches
3 feet 8 inches

Multiply.

2 feet 3 inches
× 6
12 feet 18 inches
or
13 feet 6 inches

Divide.

12 yards 6 feet 10 inches ÷ 2 =

$\frac{12 \text{ yards}}{2}$ $\frac{6 \text{ feet}}{2}$ $\frac{10 \text{ inches}}{2}$ =

6 yards 3 feet 5 inches

Directions Add these units of measure and simplify answers.

1. 4 yards 3 feet
+ 2 yards 4 feet

2. 8 feet 11 inches
+ 2 feet 5 inches

3. 5 feet 6 inches + 6 feet 2 inches

4. 7 yards 6 feet + 4 yards 6 feet

5. 6 yards 11 inches + 5 yards 9 inches

Directions Subtract these units of measure. Simplify the answers.

6. 12 yards 2 feet
− 3 yards 3 feet

7. 9 feet 11 inches
− 2 feet 9 inches

8. 2 yards 2 feet − 4 feet = _____

9. 8 feet 6 inches − 3 feet 9 inches = _____

10. 1 foot 4 inches − 9 inches = _____

Directions Multiply these measurements.

11. 4 yards 1 foot 3 inches
× 4

12. 10 feet 5 inches
× 3

13. 2 × (3 feet 2 inches) = _____

14. 3 × (3 yards 2 feet 7 inches) = _____

15. 8 × (7 yards 3 feet) = _____

Directions Divide these measurements.

16. (18 yards 24 feet 9 inches) ÷ 3 = _____

17. (4 yards 2 feet 8 inches) ÷ 2 = _____

18. (66 yards 33 feet 11 inches) ÷ 11 = _____

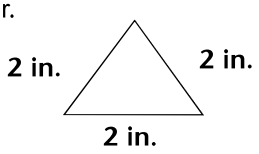
19. (24 yards 8 feet 16 inches) ÷ 8 = _____

20. (25 yards 15 feet 5 inches) ÷ 5 = _____

Perimeter

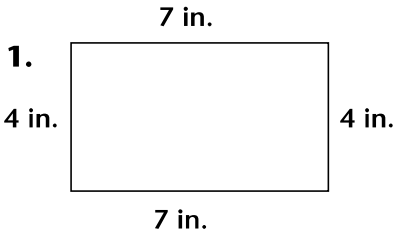
EXAMPLE Add the lengths of all sides to get perimeter.

$2 + 2 + 2 = 6$ in.

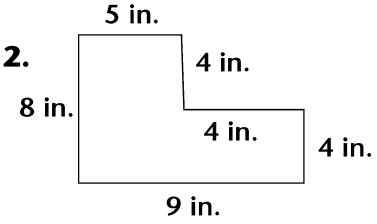


Directions Find the perimeter of each shape.

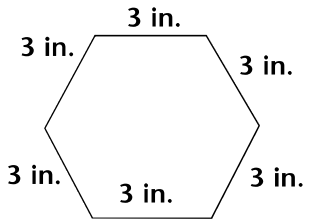
1.



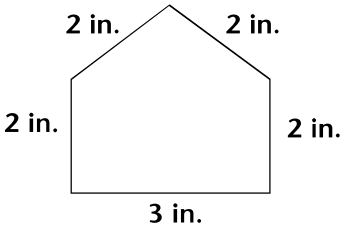
2.



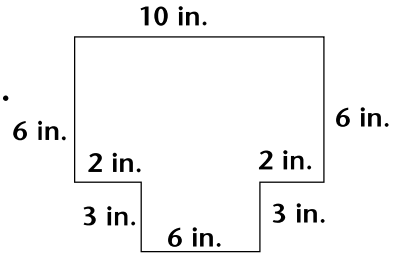
3.



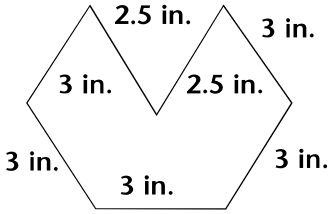
4.



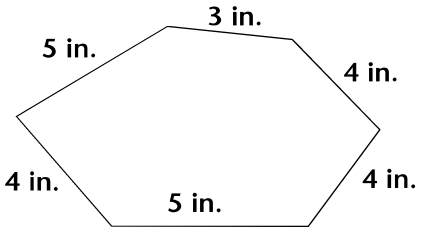
5.



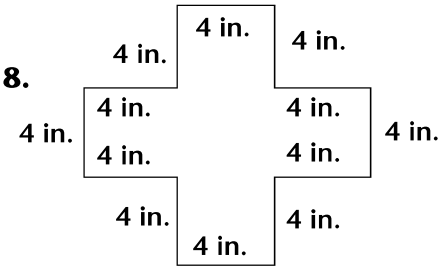
6.



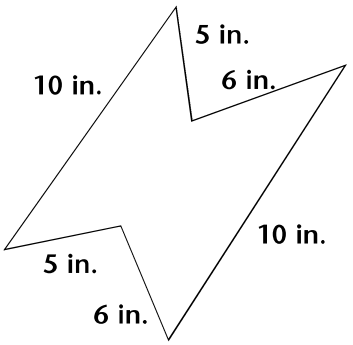
7.



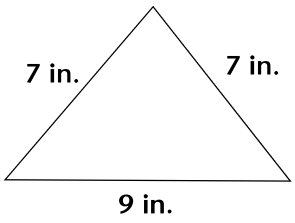
8.



9.



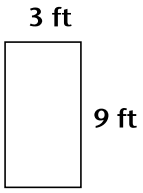
10.



Area

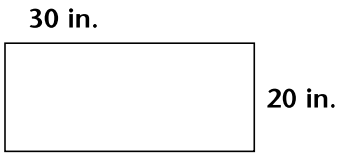
EXAMPLE Multiply length by width to find the area.

$L \times W = A$
$9 \times 3 = A$
27 square feet = A

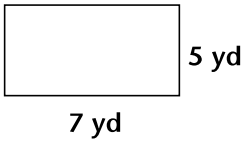


Directions Find the area of each rectangle.

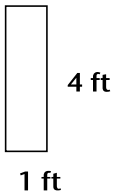
1.



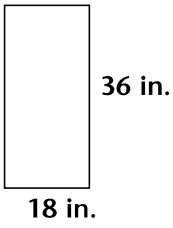
2.



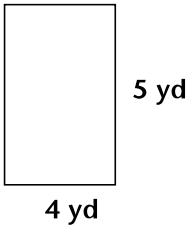
3.



4.



5.

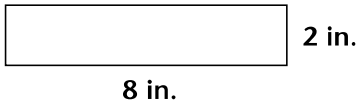


6.

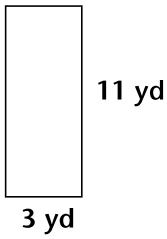
7.

8.

9.



10.



Area of Triangles

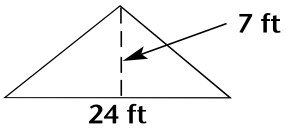
EXAMPLE Find the area of a triangle whose base is 24 feet and height is 7 feet.

Area $= \frac{1}{2}$ base $\times$ height

$A = \frac{1}{2}(24) \times 7$

$A = 12 \times 7$

$A = 84$ square feet



Directions Find the area of each triangle described below.

1. base = 16 feet
height = 6 feet _____

2. base = 41 feet
height = 32 feet _____

3. base = 40 feet
height = 10 feet _____

4. base = 50 feet
height = 12 feet _____

5. base = 12 feet
height = 10 feet _____

6. base = 5 feet
height = 4 feet _____

7. base = 20 inches
height = 10 inches _____

8. base = 33 inches
height = 50 inches _____

9. base = 9 yards
height = 18 yards _____

10. base = 10 yards
height = 15 yards _____

11. base = 6 inches
height = 17 inches _____

12. base = 3 yards
height = 20 yards _____

13. base = $\frac{2}{3}$ inch
height = 12 inches _____

14. base = $\frac{3}{4}$ foot
height = 16 feet _____

15. base = $1\frac{1}{8}$ inches
height = 6 inches _____

16. base = 10 yards
height = $4\frac{1}{2}$ yards _____

17. base = 20 yards
height = 5 yards _____

18. base = 10 feet
height = 2 feet _____

19. base = $\frac{1}{2}$ inch
height = $\frac{1}{16}$ inch _____

20. base = $1\frac{1}{16}$ inches
height = 6 inches _____

Area of Parallelograms

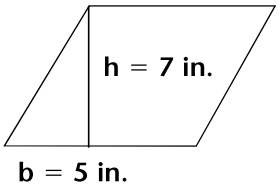
EXAMPLE To find area of a parallelogram, multiply base by height.

Area = base × height

A = bh b = 5 in. h = 7 in.

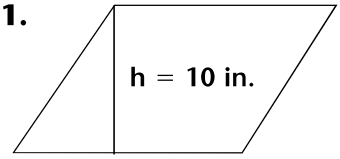
A = 5 × 7

A = 35 square inches



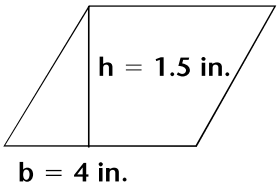
Directions Find the area of each parallelogram.

1.



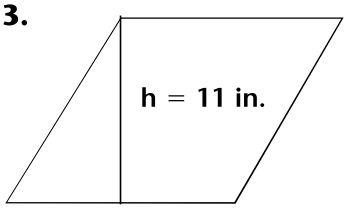
Area = _____

2.



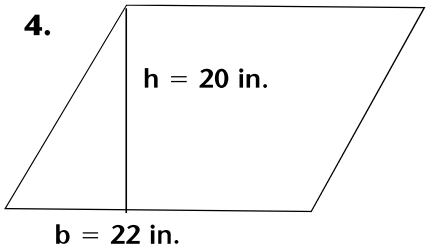
Area = _____

3.



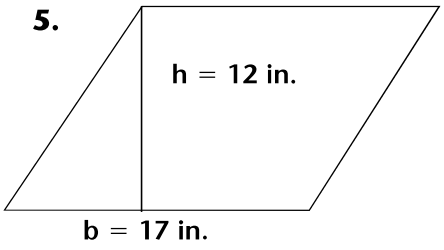
Area = _____

4.



Area = _____

5.



Area = _____

6. base = 20 feet
height = 30 feet

Area = _____

7. base = 34 yards
height = 10 yards

Area = _____

8. base = 4 inches
height = 14 inches

Area = _____

9. base = 12 feet
height = 6 feet

Area = _____

10. base = 21 miles
height = 2 miles

Area = _____

11. base = 1 foot
height = 1 foot

Area = _____

12. base = 14 inches
height = 1 foot

Area = _____

13. base = 4.5 inches
height = 4 inches

Area = _____

14. base = 5 inches
height = 1 foot

Area = _____

15. base = 3 yards
height = 4 feet

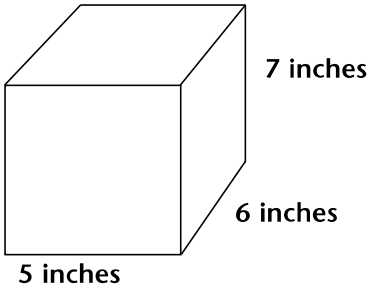
Area = _____

Volume of Rectangular Prisms

EXAMPLE

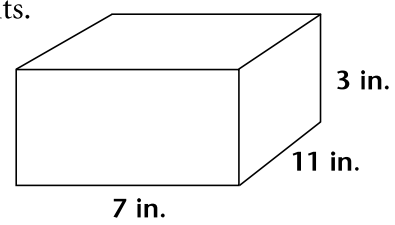
Multiply length by width by height to find volume.

Volume = area of base × height
= length × width × height
= 5 in. × 6 in. × 7 in.
= 30 square inches × 7 in.
= 210 cubic inches



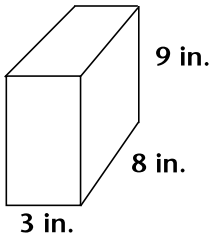
Directions Compute the volume for these prisms. Express your answers in cubic units.

1.



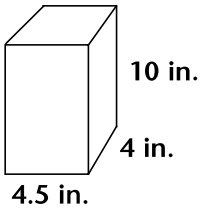
Volume = _____

2.



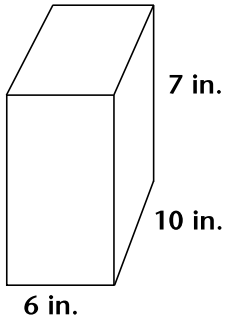
Volume = _____

3.



Volume = _____

4.



Volume = _____

5. length = 20 yards
width = 7 yards
height = 4 yards

Volume = _____

6. length = 2 feet
width = 5 feet
height = 10 feet

Volume = _____

7. length = 15 feet
width = 7 feet
height = 5 feet

Volume = _____

8. length = 13 feet
width = 5 feet
height = 2 feet

Volume = _____

9. length = 6 in.
width = 14 in.
height = 4 in.

Volume = _____

10. length = 10 in.
width = 12 in.
height = 9 in.

Volume = _____

Volume of Triangular Prisms

EXAMPLE

Multiply $\frac{1}{2}$ area of base by height to find volume.

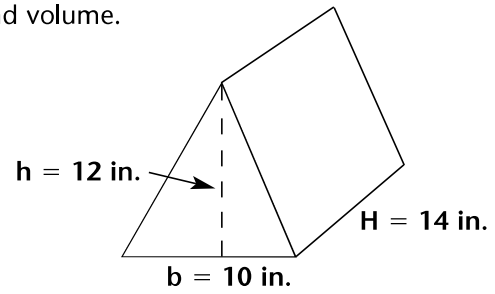
Volume $= \frac{1}{2}$ (base $\times$ height) Height

$= \frac{1}{2}(10 \times 12) \times 14$

$= \frac{1}{2}(120) \times 14$

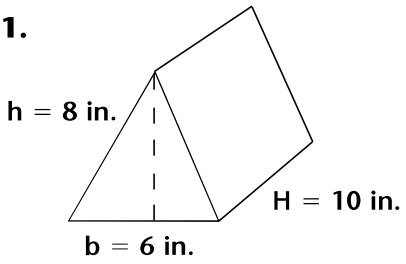
$= 60 \times 14$

$= 840$ cubic inches



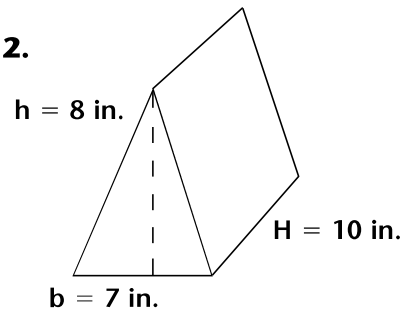
Directions Find the volume of these triangular prisms.

1.



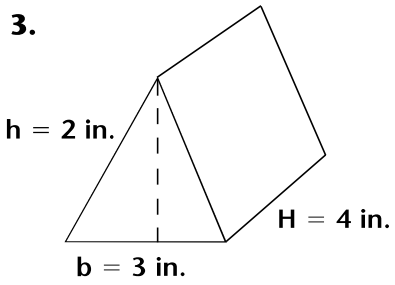
Volume = _____

2.



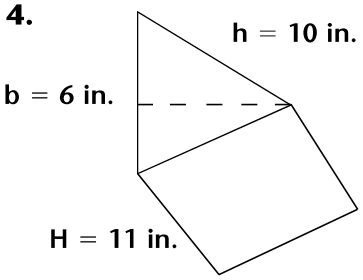
Volume = _____

3.



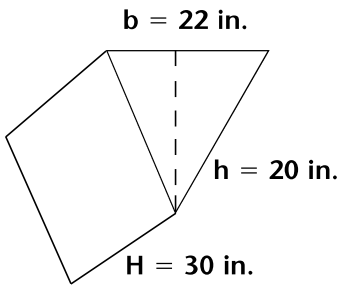
Volume = _____

4.



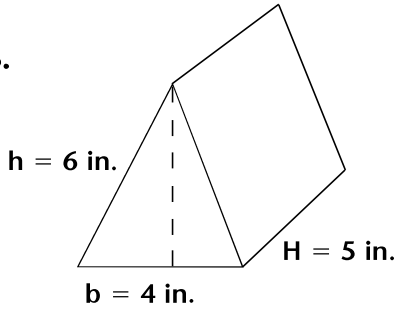
Volume = _____

5.



Volume = _____

6.



Volume = _____

7. base = 30 inches
height = 10 inches
Height = 15 inches

Volume = _____

8. base = 40 inches
height = 10 inches
Height = 20 inches

Volume = _____

9. base = 16 inches
height = 12 inches
Height = 22 inches

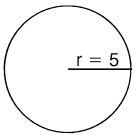
Volume = _____

10. base = 20 inches
height = 15 inches
Height = 17 inches

Volume = _____

Finding Circumference

EXAMPLE Find the circumference of a circle with a radius of 5 inches.



Circumference = $\pi \times d$ where $\pi = 3.14$

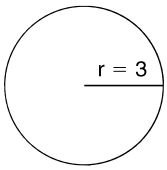
$C = 3.14 \times 10$ because diameter = $2 \times$ radius

$C = 31.4$ inches

Remember to multiply the radius by 2 to get the diameter for the formula. $C = \pi \times d$

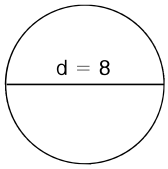
Directions Find the circumference of these circles.

1.



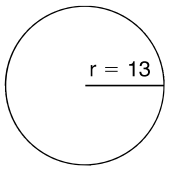
C = _____

3.



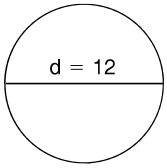
C = _____

5.



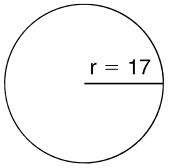
C = _____

2.



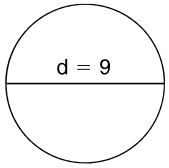
C = _____

4.



C = _____

6.



C = _____

7. diameter = 22

Circumference = _____

8. diameter = 25

Circumference = _____

9. radius = 16

Circumference = _____

10. radius = 20

Circumference = _____

Area and Circumference of Circles

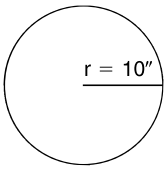
EXAMPLES Find the area and circumference of a circle with a radius of 5 inches.

Area $= \pi r^2$
$= 3.14 \times 5^2$
$= 3.14 \times 25$
$= 78.50$ square inches

Circumference $= 2 \pi r$
$= 2 \times 3.14 \times 5$
$= 31.4$ inches

Directions Solve for the area and circumference for each circle. Use 3.14 for π. The abbreviation for circumference is C.

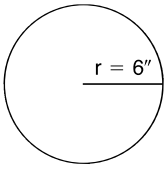
1.



Area = _____

C = _____

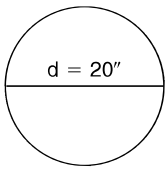
2.



Area = _____

C = _____

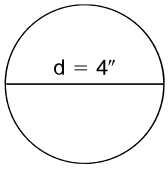
3.



Area = _____

C = _____

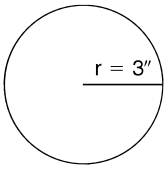
4.



Area = _____

C = _____

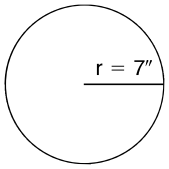
5.



Area = _____

C = _____

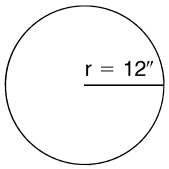
6.



Area = _____

C = _____

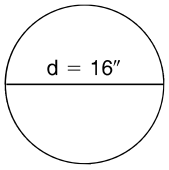
7.



Area = _____

C = _____

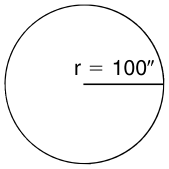
8.



Area = _____

C = _____

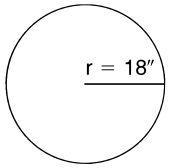
9.



Area = _____

C = _____

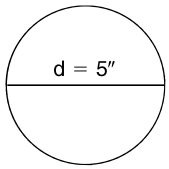
10.



Area = _____

C = _____

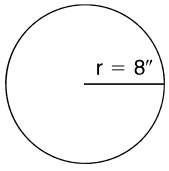
11.



Area = _____

C = _____

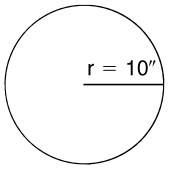
12.



Area = _____

C = _____

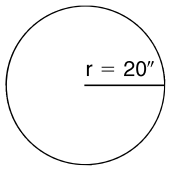
13.



Area = _____

C = _____

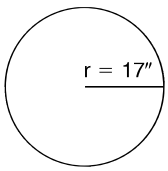
14.



Area = _____

C = _____

15.

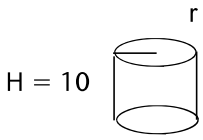


Area = _____

C = _____

Volume of a Cylinder

EXAMPLE Volume = $\pi r^2 H$

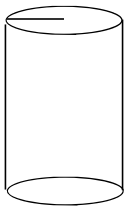


Volume = $\pi \times 3^2 \times 10$
= $3.14 \times 9 \times 10$
= 3.14×90
= 282.6 cubic units

Remember volume is expressed as cubic units.

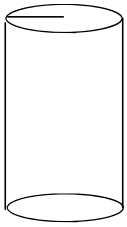
Directions Find the volume for each cylinder.

1.



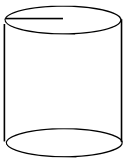
V = _____

3.



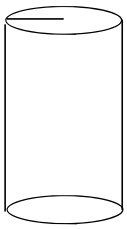
V = _____

5.



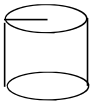
V = _____

2.



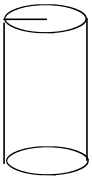
V = _____

4.



V = _____

6.



V = _____

7. radius = 11
height = 10
Volume = _____

8. radius = 10
height = 15
Volume = _____

9. radius = 20
height = 22
Volume = _____

10. radius = 8
height = 18
Volume = _____

Units of Time

EXAMPLE Add.

$$\begin{array}{rrr} & 5 \text{ weeks} & 3 \text{ days} \\ + & & 4 \text{ days} \\ \hline & 5 \text{ weeks} & 7 \text{ days} \end{array} = 6 \text{ weeks}$$

Directions Perform the indicated operations. Simplify the answers.

1. 6 weeks 4 days
\+ 4 days

2. 3 years 2 weeks 6 days
\+ 2 years 6 weeks 3 days

3. 7 weeks 4 days
\+ 2 weeks 5 days

4. 9 weeks 5 days
− 7 weeks 6 days

5. 8 years 6 weeks 3 days
− 3 years 5 weeks 6 days

6. 5 weeks 3 days
− 6 days

7. 15 years 9 weeks
− 7 years 7 weeks

8. 10 years 2 weeks 1 day
− 8 years 5 weeks 4 days

9. 3 days 12 hours 10 min
\+ 3 days 7 hours 56 min

10. 5 hours 10 min 5 sec
\+ 8 hours 50 min 58 sec

11. 2 hours 20 min 4 sec
− 1 hour 10 min 7 sec

12. 4 hours 10 min 5 sec
− 3 hours 9 min 5 sec

13. 3 hours 2 min
− 2 hours 8 min

14. 7 hours 8 sec
− 6 hours 10 min

15. 3 days = _____ hours

16. 18 minutes = _____ seconds

17. 3 years = _____ weeks

18. 180 seconds = _____ minutes

19. 5 weeks 3 days − 3 weeks 5 days 3 hours = _____

20. 8 years 8 weeks 2 days + 2 years 9 weeks 5 days = _____

21. 4 hours 3 min 34 sec − 2 hours 7 min 50 sec = _____

22. 5 min 45 sec + 5 hours 4 min 49 sec = _____

23. 35 hours 24 sec − 9 hours 28 min = _____

24. 55 min 19 sec + 1 hour 20 min 4 sec = _____

25. 36 hours − 3 hours 5 min 6 sec = _____

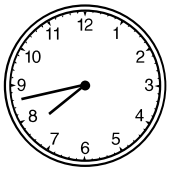
Time Problems

You can solve word problems involving elapsed time by adding or subtracting time. You may need to rename in some problems. Remember that there are 60 minutes in one hour.

EXAMPLE Mr. Winkle went to sleep at 11:25 last night. He looked at the clock when he woke up. How long did he sleep?

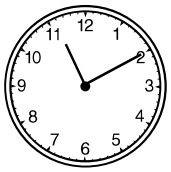
$$\begin{array}{rcr} 7{:}43 & = & 19{:}43 \\ -\ 11{:}25 & = & -\ 11{:}25 \\ \hline & & 8{:}18 \end{array}$$

Mr. Winkle slept 8 hours and 18 minutes.

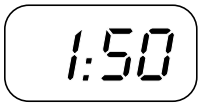


Directions Solve each word problem. Use the clock shown with each problem to help you.

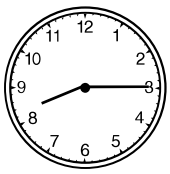
1. Tanya started to play tennis at 9:30. How long has she been playing?



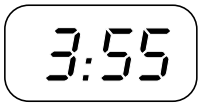
2. Emily left for the ocean at 7:45. She saw a clock when she arrived. How long was the trip?



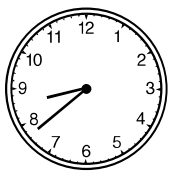
3. A video lasts 117 minutes. At what time will it be finished?



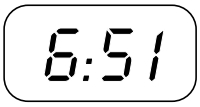
4. The roast is to cook for 2 hours and 15 minutes. At what time will it be finished cooking?



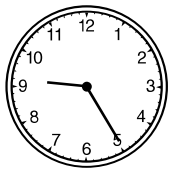
5. We can play for another half of an hour. At what time must we come in?



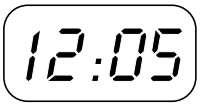
6. Carmine's favorite program comes on at 8:30. How long until it starts?



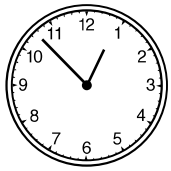
7. Niki arrived at the doctor's office at 8:45. She glanced at the clock when her name was called. How long did she wait?



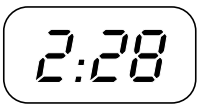
8. Jared started the meeting at 10:15. Afterward, he looked at the clock. How long was the meeting?



9. The bus from Duluth will arrive at 3:23. How long until it arrives?



10. Carlos put money in the parking meter for $1\frac{1}{2}$ hours. When must he return?



Reading Pictographs

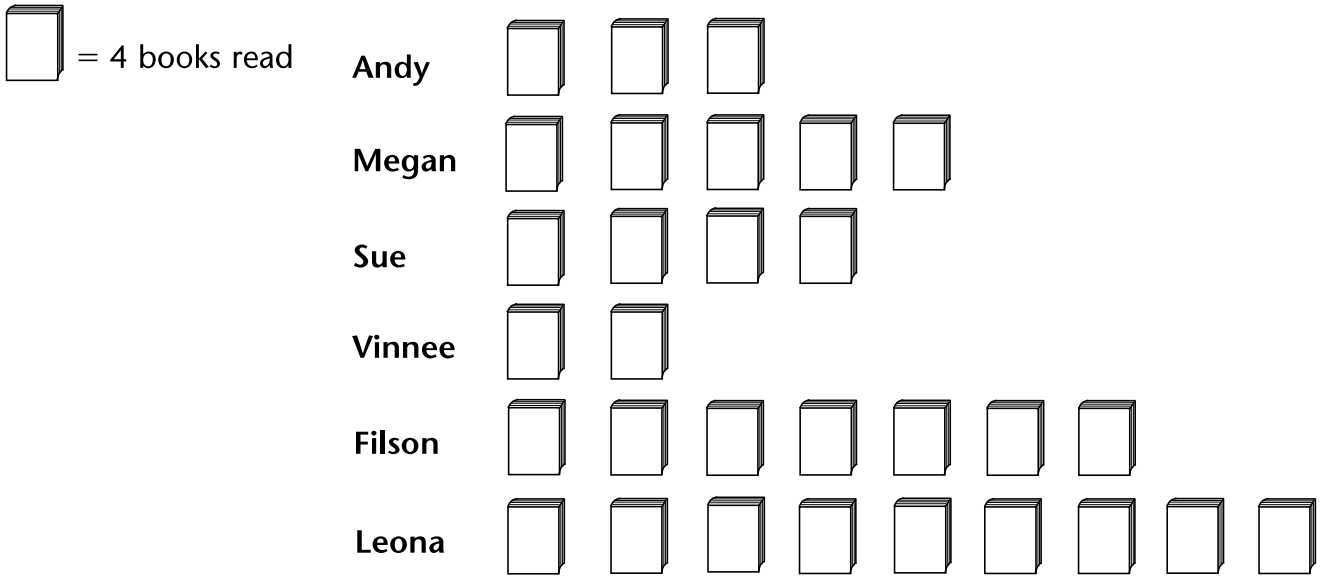
EXAMPLE

Look at the pictograph below.

One book is equal to 4 books read.
How many books did Andy read?
3 whole books are pictured.
$3 \times 4 = 12$

Andy read 12 books.

Summer Book Reading Club



Directions Use the pictograph to answer the questions.

1. How many books did Megan read for the summer? _____
2. How many books did Sue read? _____
3. How many books did Filson read? Did he read more than Andy? _____
4. How many books did Vinnee read? _____
5. How many books did Sue and Andy read? _____
6. What was the total number of books read by the club? _____
7. What is the title of this graph? _____
8. How many books would Megan need to read to match Filson's total? _____
9. How many books did Leona read? _____
10. How many did both Leona and Megan read? _____

Constructing Bar Graphs

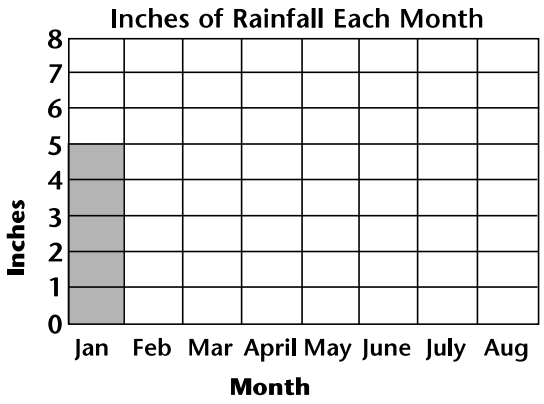
EXAMPLE

January = 5 inches

Find January on the horizontal line.

Find 5 on the vertical line.

Shade the bar from the horizontal line to 5.



Directions Shade the data for each bar of the graphs.

Jan = 3 inches

Feb = 5 inches

March = 4 inches

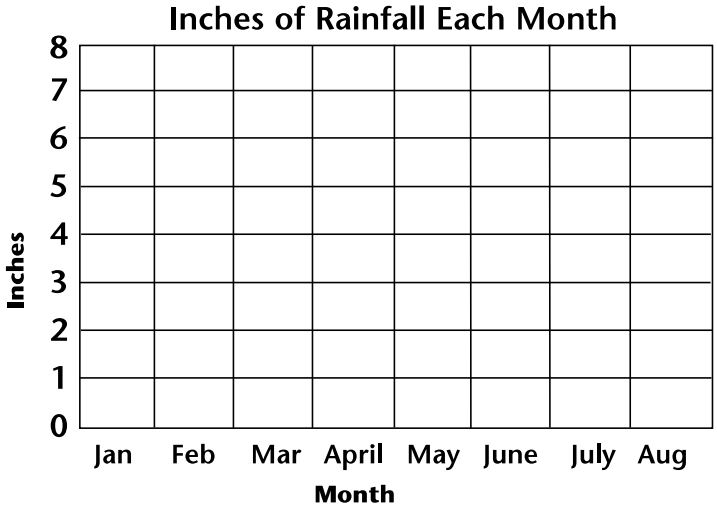
April = 2 inches

May = 6 inches

June = 5 inches

July = 8 inches

Aug = 5 inches



Jan = 6 inches

Feb = 3 inches

March = 7 inches

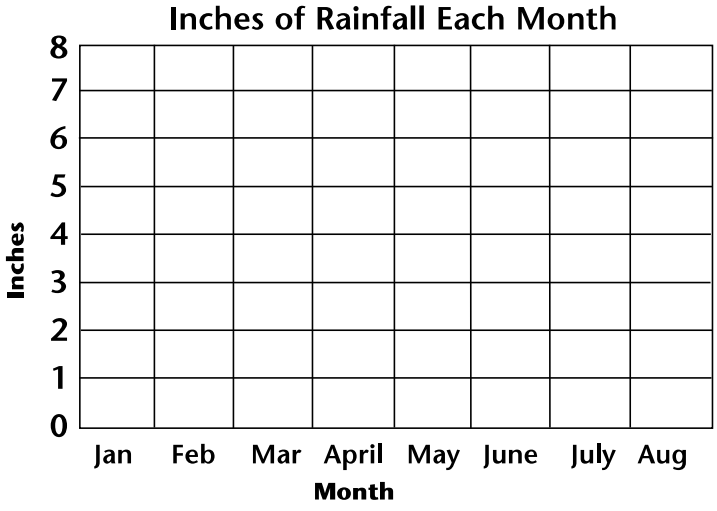
April = 1 inches

May = 4.5 inches

June = 8 inches

July = 3.5 inches

Aug = 1.5 inches



Reading Divided Bar Graphs

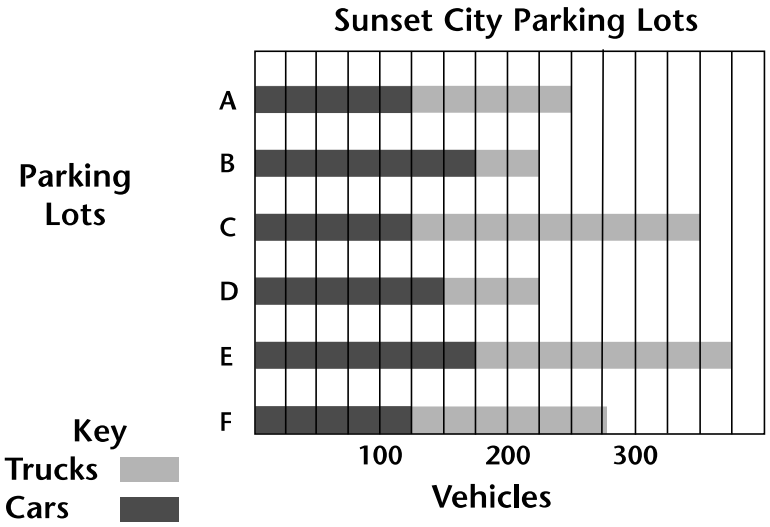
EXAMPLE

How many trucks are in Lot F?

Find F on the graph.
Determine the scale.
Read the key.
The scale in each section equals 25 vehicles.
Trucks make up 6 sections.

$25 \times 6 = 150$ 150 trucks are in Lot F.

Directions Use the divided bar graph to answer the questions.



1. How many trucks are parked in Lot D? _____

2. How many cars are located in Lot B? _____

3. How many vehicles are in Lot F? _____

4. How many trucks are in Lot A? _____

5. How many vehicles are in Lot C? _____

6. How many vehicles are in Lot D? _____

7. How many cars are parked in Lot E? _____

8. How many vehicles are shown for Lots D and E together? _____

9. How many vehicles are shown for Lots A and B together? _____

10. How many vehicles are parked in Sunset City parking lots? _____

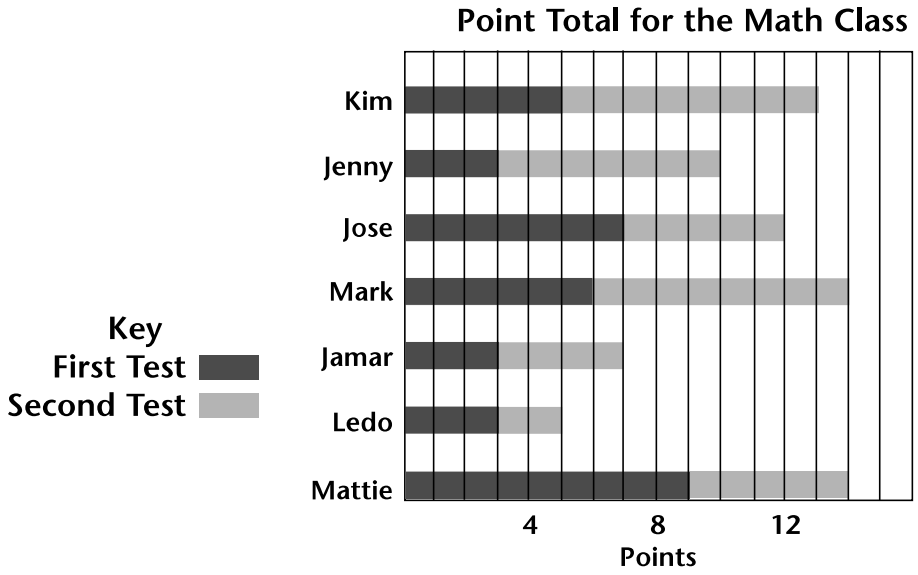
Constructing Divided Bar Graphs

EXAMPLE

How many points did Mattie score on the first test?

Find Mattie on the graph.
Determine the scale.
Read the key.
The scale is 1 section equals 1 point.
Mattie's first test shows 9 sections.
Mattie scored 9 points.

Directions Use the divided bar graph to answer the questions.



1. Did Jamar score more total points than Jenny? _____

2. How many total points did Jose score? _____

3. How many points did Ledo score on the first test? _____

4. How many points did Kim score on the second test? _____

5. What are the total points accumulated for Mark and Kim? _____

6. What are the total points accumulated for all the students? _____

7. What are the total points for Jenny and Mark on the second test? _____

8. What are the total points scored on the first test? _____

9. What is the difference between the first and second test totals? _____

10. What was Ledo's total point accumulation? _____

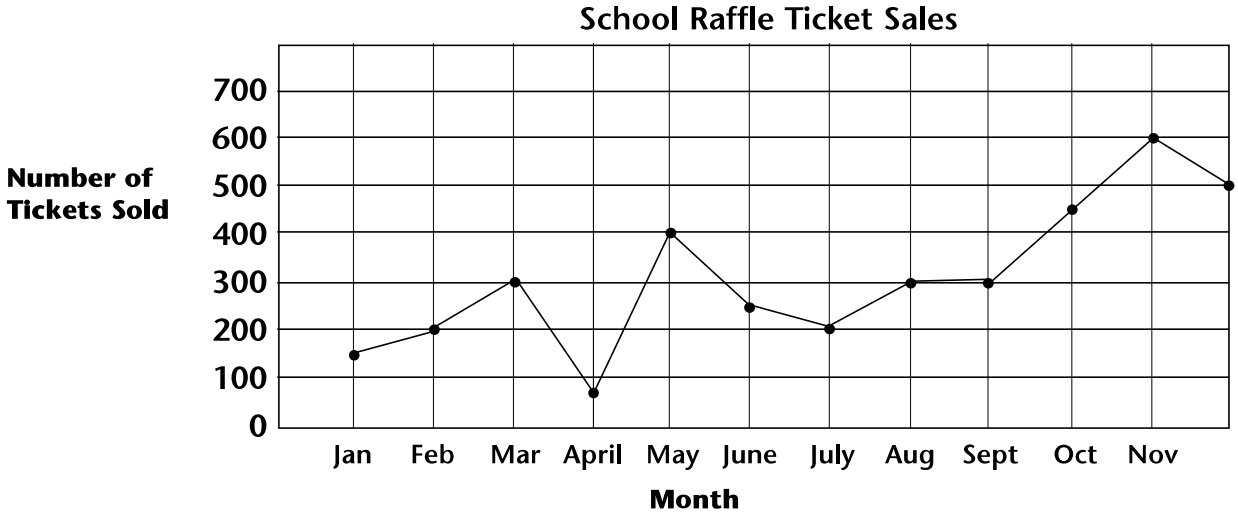
Reading Line Graphs

EXAMPLE

How many tickets were sold in January?

Find January (Jan) on the graph.
Use a straightedge to align the point for January with the vertical line.
Read the number.
150 tickets were sold in January.

Directions Use the line graph to answer the questions about the school's raffle ticket sale.



1. Were there more tickets sold in May than October? _____
2. How many tickets were sold in May? October? _____
3. How many tickets were sold in March? _____
4. How many tickets were sold in the summer months of June and July? _____
5. What month had the highest sales? _____
6. What month had the lowest sales? _____
7. How many more tickets were sold in May than July? _____
8. How many tickets were sold in February? _____
9. How many tickets were sold in June? _____
10. What was the total number of tickets sold? _____

Circle Graphs

EXAMPLE The Davises have an annual income of $24,000.00.
How much do they spend on food?

Find the section labeled food and identify its percent of the budget.

Multiply. $24,000.00 × 30% =
$24,000.00 × 0.30= $7,200.00

Directions Answer the following questions about this graph.
Use an annual income of $24,000 for problems 2–4.

1. What do the members of the Davis family spend most of their money on? _____

2. How much do they spend for clothing? _____

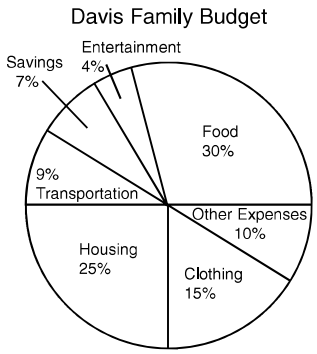
3. How much do they save each year? _____

4. What do they spend for entertainment? _____

5. How much do the Davises spend for each category in their budget if their annual income is $48,400.00?

Food _____ Clothing _____ Transportation _____

Housing _____ Savings _____ Entertainment _____



Directions Make a circle graph to show the information in the table below.
Follow these six steps:

Step 1 Draw a large circle. Mark the center of the circle with a dot.

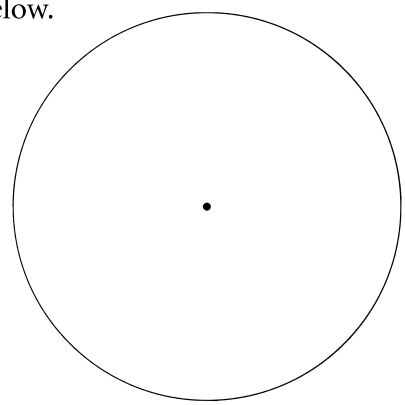
Step 2 Draw a radius.

Step 3 Find out how many degrees are in each sector. To find the degrees, multiply the percent or fraction by the 360° in a circle. (Example: 360° × 10% = 36°)

Step 4 Use a protractor to measure and draw each sector. Use the center of the circle as the vertex of each angle.

Step 5 Label each sector and mark the appropriate percent or fraction.

Step 6 Give the graph a title.



The Thomas Family Budget	
Category	**Percent Allowed**
Food	25%
Housing	30%
Clothing	20%
Car	10%
Savings	5%
Other	10%

Graphs That Mislead

EXAMPLE

Draw a bar showing 3 games won in September on each graph.

Find September on the graphs.
Give a title for the graphs.
Shade sections to show 3 games in each graph.

Directions Make the bar graphs below. Then answer the questions on your own paper.

Walbrook High School basketball stats
for the current school year

Month	**Games won**
September	2 games
October	3 games
November	4 games
December	5 games
January	6 games
February	8 games
March	7 games

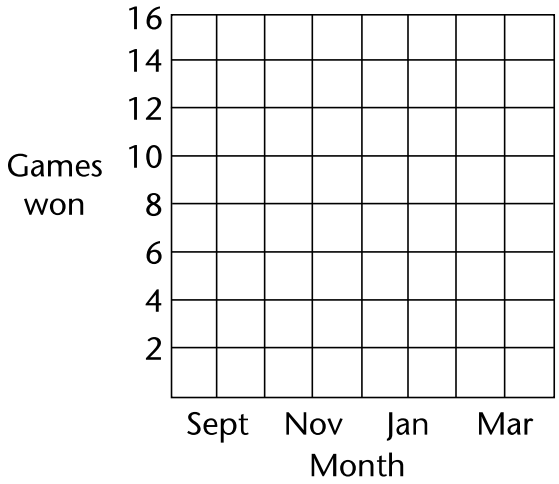
1. Construct 2 bar graphs for the data. Use the templates given below.

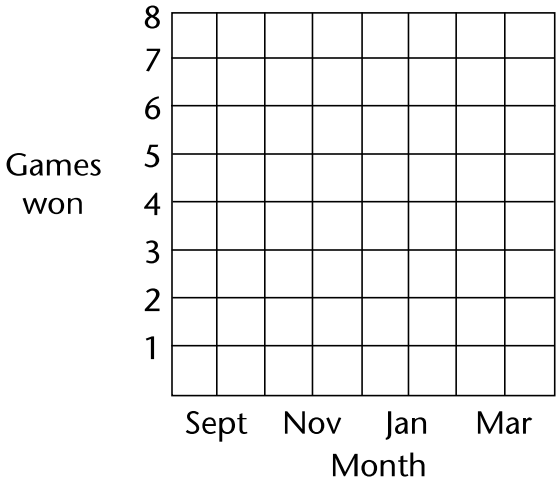
2. Give a title for each graph.

3. How do the graphs differ?

4. Why does graph 2 look better than graph 1?

5. Does one graph represent the data better than the other? Explain.





Scale Models

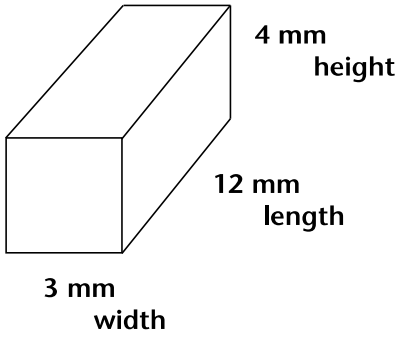
EXAMPLE The building block shown below is a scale model of a much bigger block using 1:50 scale. How long is the actual block?

$\frac{1}{50} = \frac{12}{n}$

$50 \times 12 = n$

$600 \text{ mm} = n$ 600 mm is the length of the actual building block.

Directions Use the model to solve each problem.



1. The ratio is changed to 1:25.

a. Solve for the actual length. _____

b. Solve for the actual width. _____

c. Solve for the actual height. _____

2. Solve for all three components if the ratio is 1:75.

_____ _____ _____

3. Solve for all three components if the ratio is 1:200.

_____ _____ _____

4. Solve for all three components if the ratio is 1:100.

_____ _____ _____

5. Solve for all three components if the ratio is 1:80.

_____ _____ _____

Scale Drawings

EXAMPLE The wagon below measures $\frac{1}{2}$ inch high and $2\frac{1}{2}$ inches long. The scale ratio is 1:50. How long is the actual wagon?

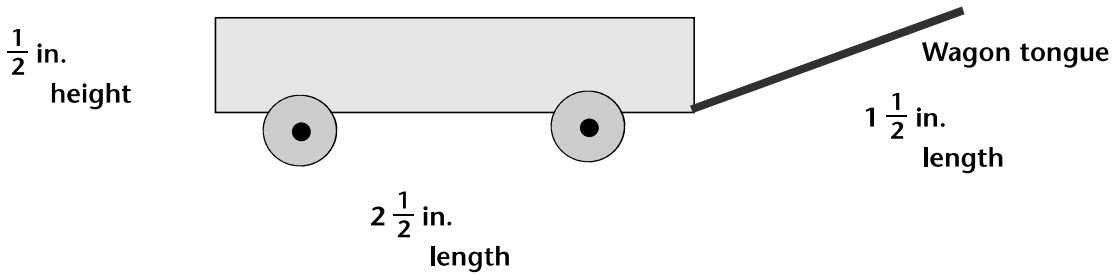
$$\frac{1}{50} = \frac{2\frac{1}{2}}{n}$$

$$2\frac{1}{2} \times 50 = n$$

$$\frac{5}{2} \times 50 = \frac{250}{2} = 125$$

125 inches = n The actual wagon is 125 inches long.

Directions Use the model to solve each problem.



1. Solve for the actual height of the wagon if the scale is 1:50. _____

2. Solve for the actual height of the wagon if the scale is 1:25. _____

3. Solve for the actual length of the wagon with a scale of 1:100. _____

4. How long is the wagon tongue if the scale is 1:50? _____

5. How long is the wagon tongue if the scale is 1:25? _____

Floor Plans

EXAMPLE The scale is 1 inch for each 8 feet. Find the actual dimensions of this drawing in feet.

Find the length.

Set up a proportion.

$\frac{1}{8} = \frac{6}{n}$

$8 \times 6 = n$

48 feet $= n$ Actual length is 48 feet.

Find the width.

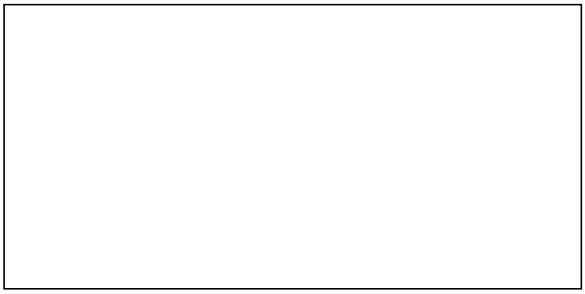
Set up a proportion.

$\frac{1}{8} = \frac{3}{n}$

$8 \times 3 = n$

24 feet $= n$ Actual width is 24 feet.

Scale
1 inch = 8 feet



width = 3 inches

length = 6 inches

Directions Use proportions to solve each problem.

1. Find the actual measurements in feet of a room drawing that measures 4 inches by 5 inches with a scale of 1 inch = 3 feet.

length _____ width _____

2. Find the actual measurements in feet of a room drawing that measures 3 inches by 4 inches with a scale of 1 inch = 4 feet.

length _____ width _____

3. Scale of 1 inch = 5 feet
length = 4 inches
width = 3 inches
actual length = _____
actual width = _____

4. Scale of 1 inch = 4 feet
length = 7 inches
width = 6 inches
actual length = _____
actual width = _____

5. Scale of 1 inch = 6 feet
length = 5 inches
width = 3 inches
actual length = _____
actual width = _____

Map Distances

EXAMPLE

Use a scale of 1 inch = 500 miles.

Solve for the actual distance between two cities if they measure $3\frac{1}{2}$ inches apart.

$3\frac{1}{2} \times 500 =$ actual distance

$\frac{7}{2} \times 500 =$ actual distance

$\frac{3{,}500}{2} =$ actual distance

1,750 miles The actual distance is 1,750 miles.

Directions Use the information to solve each problem.

1. scale of 1 inch = 600 miles
measured distance of $2\frac{1}{2}$ inches
actual distance = _____

2. scale of 1 inch = 500 miles
measured distance of $3\frac{1}{2}$ inches
actual distance = _____

3. scale of 1 inch = 400 miles
measured distance of 5 inches
actual distance = _____

4. scale of 1 inch = 14 miles
measured distance of 6 inches
actual distance = _____

5. scale of 1 inch = 13 miles
measured distance of $4\frac{1}{2}$ inches
actual distance = _____

6. scale of 1 inch = 35 miles
measured distance of $4\frac{1}{2}$ inches
actual distance = _____

7. scale of 1 inch = 40 miles
measured distance of 7 inches
actual distance = _____

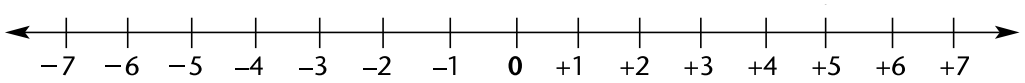
8. scale of 1 inch = $12\frac{1}{2}$ miles
measured distance of 6 inches
actual distance = _____

9. scale of 1 inch = 100 miles
measured distance of 3 inches
actual distance = _____

10. scale of 1 inch = 200 miles
measured distance of $1\frac{1}{2}$ inches
actual distance = _____

Integers

EXAMPLES Compare the numbers using < and >.



1 5 < means less than. Read 1 is less than 5. 1 < 5

6 2 > means more than. Read 6 is more than 2. 6 > 2

Directions Use the number line to help you compare the integers in each pair using < or >.

1.	−1 8	**6.**	−9 −5	**11.**	−11 −1	**16.**	−5 0
2.	−1 −2	**7.**	+1 −3	**12.**	−1 0	**17.**	−3 −5
3.	3 −3	**8.**	0 −9	**13.**	0 −19	**18.**	+7 −1
4.	+4 −5	**9.**	−4 +2	**14.**	−1 +1	**19.**	−34 +32
5.	+5 +9	**10.**	−4 −5	**15.**	−8 +1	**20.**	+19 −1

Directions Find the sum of these integers.

21. 0 + 3 _____	**24.** −3 + 3 _____	**27.** −9 + 0 _____
22. −8 + 8 _____	**25.** −1 + 1 _____	**28.** −1 + 0 _____
23. +9 + (−9) _____	**26.** −2 + 2 _____	

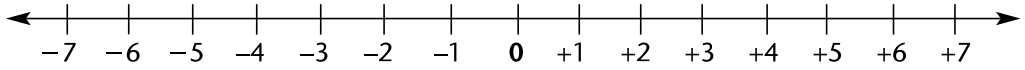
Directions Name the opposite of each integer.

29. −23 _____	**32.** 0 _____	**35.** −29 _____	**38.** −201 _____
30. +54 _____	**33.** +33 _____	**36.** −211 _____	**39.** −101 _____
31. −1 _____	**34.** +1 _____	**37.** +22 _____	**40.** +46 _____

Adding Positive and Negative Integers

EXAMPLE Find the sum of 2 and (−8).

Begin at 2 on the number line. Move 8 places left.



2 + (−8) = −6

Directions Use a number line to help find each sum.

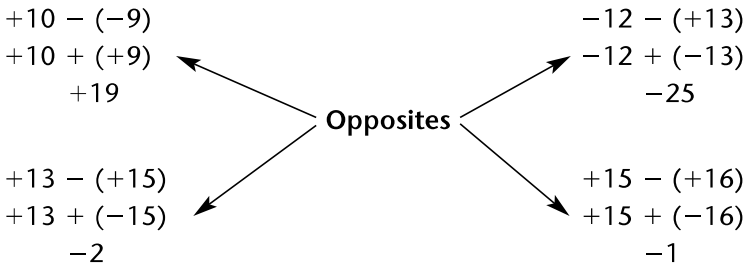
1. +3 + (−7) _____
2. −3 + (+2) _____
3. −3 + (+8) _____
4. −9 + (−1) _____
5. −3 + (−1) _____
6. −7 + (+1) _____
7. −1 + (−1) _____
8. −9 + (+1) _____
9. −3 + (+9) _____
10. +2 + (+4) _____
11. +8 + (−1) _____
12. +2 + (−2) _____
13. −11 + (−12) _____
14. −10 + (−10) _____
15. −1 + 0 _____
16. −13 + (−12) _____
17. +11 + (−21) _____
18. −19 + (+10) _____
19. +12 + (−16) _____
20. −14 + (+1) _____

Directions Give the absolute value for each number.

21. |−3| _____
22. |+12| _____
23. |−1| _____
24. |−11| _____
25. |−6| _____
26. |−77| _____
27. |+8| _____
28. |−99| _____
29. |+22| _____
30. |−202| _____
31. |−33| _____
32. |+17| _____
33. |+21| _____
34. |−28| _____
35. |+102| _____
36. |+38| _____
37. |+51| _____
38. |−18| _____
39. |−111| _____
40. |−90| _____

Subtracting Positive and Negative Integers

EXAMPLES Change subtraction problems to addition of the opposite.



Directions Solve these subtraction problems by changing to adding the opposite.

1. +1 − (−12) _____

2. +22 − (−12) _____

3. +10 − (−12) _____

4. +20 − (−12) _____

5. −9 − (+11) _____

6. −31 − (+20) _____

7. +21 − (−20) _____

8. +3 − (+3) _____

9. −29 − (+23) _____

10. −21 − (+21) _____

11. +34 − (−23) _____

12. +56 − (−40) _____

13. −31 − (−13) _____

14. −90 − (+41) _____

15. +26 − (−50) _____

16. −11 − (−51) _____

17. −14 − (−33) _____

18. −10 − (−22) _____

19. −28 − (+1) _____

20. −10 − (−40) _____

21. +20 − (−50) _____

22. −18 − (+7) _____

23. −21 − (−22) _____

24. −20 − (+20) _____

25. +2 − (−1) − (−2) − (+11) _____

26. +1 − (−3) − (+3) − (−10) _____

27. −10 − (−11) − (+12) − (−12) _____

28. −1 − (+1) − (+2) − (−3) _____

29. +12 − (−10) − (−11) − (+20) _____

30. +11 − (−10) − (−1) − (+2) _____

Word Problems

EXAMPLE Subtract by adding the opposite.

$-19 - (+10) + (-15)$

$-19 + (-10) + (-15) = -44$

Directions Find these sums and differences.

1. $-2 - (+4) + (-7) - (+8)$ _____

2. $-1 + (+33) + (-10) - (-10)$ _____

3. $-10 + (-12) + (+19) - (-2)$ _____

4. $+3 - (+4) - (+5) - (-7)$ _____

5. $-4 - (-7) + (+10) + (-8)$ _____

6. $+15 - (+16) + (+10)$ _____

7. $+11 - (-11) + (+10)$ _____

8. $-19 - (-19) + (+8)$ _____

9. $+2 - (-1) - (+7) - (+8)$ _____

10. $+11 + (-10) - (+13)$ _____

Directions Write an addition sentence for each problem in the space provided and solve.

11. Marline's saving account had $750.00 and she withdrew $20.00 on Monday. She deposited $100.00 on Tuesday. Wednesday she wrote a check for $12.90. Thursday she deposited her paycheck of $175.50. Friday she deposited $100.00. How much was her final balance on Friday?

_____

12. Starting at 70 degrees, if the temperature goes up 20 degrees, then drops 10 degrees, then goes up 14 degrees, what is the new temperature?

_____

13. Milo spent $30.00 for food and $13.75 for camping supplies. He was paid $12.00 for the trip. How much does he have?

_____

14. Dante had the following expenses for his Lawn Care Service: $2.75, $5.00, $10.00, $8.00. He was paid $22.00, $25.00, $15.00, and $18.00. How much did he make after expenses?

_____

15. Teresa spent $5.95 at one store, $6.32 at another, and $15.98 at a third store. If she had $35.00 before shopping, how much does she have left?

_____

Multiplying Positive and Negative Integers

EXAMPLES

The product of two numbers with like signs will be positive.

$-3(-4) = +12$ $+2(+4) = +8$

The product of two numbers with unlike signs will be negative.

$-3(+7) = -21$ $+4(-10) = -40$

Directions Write the factor to make a correct sentence.

1. $-4(\quad) = -16$

2. $+5(\quad) = +20$

3. $(-6) = -18$

4. $-7(\quad) = -14$

5. $-6(\quad) = +24$

6. $(+8) = -64$

7. $+19(\quad) = -38$

8. $(-22) = +66$

9. $-1(\quad) = -1$

10. $+12(\quad) = -36$

11. $+9(\quad) = -27$

12. $(+4) = -48$

13. $-2(\quad)(-5) = -30$

14. $(-3)(+5) = +45$

15. $+5(+2)(\quad) = -20$

Directions Solve for the product.

16. $-5(-6) =$ _____

17. $-4(+5) =$ _____

18. $+7(-5) =$ _____

19. $-23(+2) =$ _____

20. $-2(-3)(-4) =$ _____

21. $+3(-6)(-1) =$ _____

22. $-9(+2)(-2) =$ _____

23. $-7(-7)(+2) =$ _____

24. $+9(-3)(-1) =$ _____

25. $+5(-5)(-5) =$ _____

26. $-1(-1)(-1)(-1) =$ _____

27. $+2(-8)(-2)(-1) =$ _____

28. $-4(+8)(-2) =$ _____

29. $-3(+3)(-1)(-1) =$ _____

30. $-7(+3)(+2) =$ _____

Properties of Addition and Multiplication

EXAMPLES

Commutative Property of Addition and Multiplication

$7 + 8 = 8 + 7$
$15 = 15$ Both sums equal 15.

$-3 \times (-4) = -4 \times (-3)$
$+12 = +12$ Both products equal +12.

Associative Property of Addition and Multiplication

$(6 + 2) + 8 = 6 + (2 + 8)$
$8 + 8 = 6 + 10$
$16 = 16$

$(5 \times 6) \times 2 = 5 \times (6 \times 2)$
$30 \times 2 = 5 \times 12$
$60 = 60$

Distributive Property of Multiplication with Respect to Addition and Subtraction

$3 \times (2 + 5) = 3 \times 2 + 3 \times 5$
$3 \times 7 = 6 + 15$
$21 = 21$

$4 \times (10 - 3) = 4 \times 10 - 4 \times 3$
$4 \times 7 = 40 - 12$
$28 = 28$

Directions Write the property used for each expression.

1. $-2(-4) = -4(-2)$ _____

2. $(2 \times 4) \times 5 = 2 \times (4 \times 5)$ _____

3. $2 \times (15 - 3) = 2 \times 15 - 2 \times 3$ _____

4. $7 + (5 + 4) = (7 + 5) + 4$ _____

5. $11 + 16 = 16 + 11$ _____

6. $+8(+3) = +3(+8)$ _____

7. $(3 + 7) + 8 = 3 + (7 + 8)$ _____

Directions Solve these expressions.

8. $-9 \times (+8) =$ _____

9. $-6(-8) =$ _____

10. $4 \times (12 - 7) =$ _____

11. $23 + (45 + 20) =$ _____

12. $(7 + 19) + 12 =$ _____

13. $(12 + 4) + 3 =$ _____

14. $-15(-10) =$ _____

15. $-3(-8) =$ _____

Dividing Positive and Negative Integers

EXAMPLES

The quotient of two numbers with like signs will be positive.
$-12 \div (-4) = +3$ and $+20 \div (+5) = +4$
Both answers are positive.

The quotient of two numbers with unlike signs will be negative.
$+24 \div (-2) = -12$ $\qquad \frac{-16}{+2} = -8$

Directions Solve for the quotients.

1. $-12 \div (+2) =$ _____

2. $-16 \div (+2) =$ _____

3. $+24 \div (+3) =$ _____

4. $-25 \div (-5) =$ _____

5. $+45 \div (-5) =$ _____

6. $+22 \div (-1) =$ _____

7. $+34 \div (-17) =$ _____

8. $+23 \div (+1) =$ _____

9. $-54 \div (-9) =$ _____

10. $+18 \div (-2) =$ _____

11. $-48 \div (+6) =$ _____

12. $-35 \div (-5) =$ _____

13. $+90 \div (-2) =$ _____

14. $+21 \div (-7) =$ _____

15. $+49 \div (-7) =$ _____

16. $-26 \div (-13) =$ _____

17. $-36 \div (+9) =$ _____

18. $-28 \div (+2) =$ _____

19. $\frac{-12}{-2} =$ _____

20. $\frac{+35}{-7} =$ _____

21. $\frac{+60}{-5} =$ _____

22. $\frac{-8}{-8} =$ _____

23. $\frac{+28}{-4} =$ _____

24. $\frac{-40}{+4} =$ _____

25. $\frac{+88}{-11} =$ _____

26. $\frac{+50}{+5} =$ _____

27. $\frac{+44}{-4} =$ _____

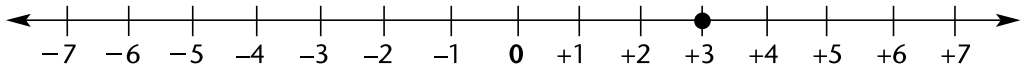
28. $\frac{-80}{+4} =$ _____

29. $\frac{+110}{-11} =$ _____

30. $\frac{+24}{+8} =$ _____

Variables and the Number Line

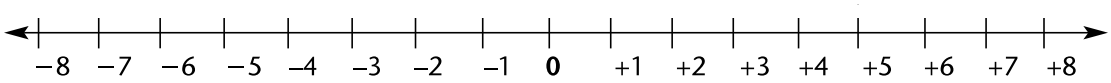
EXAMPLE Find the number on the number line. Draw a dot there.



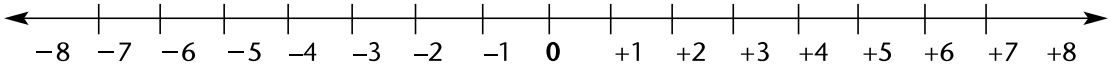
$x = 3$

Directions Graph these values of x on the number lines.

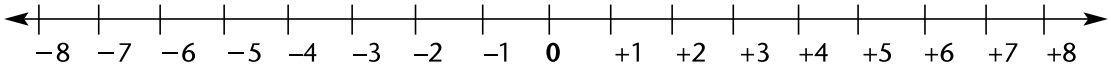
1. $x = 7$



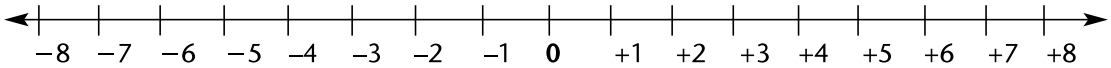
2. $x = -4$



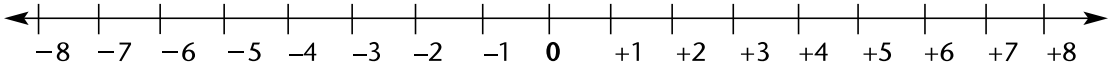
3. $x = -2$



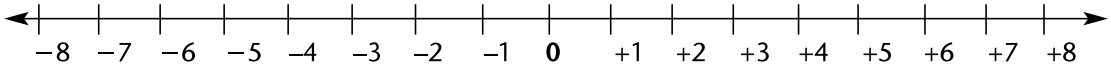
4. $x = +5$



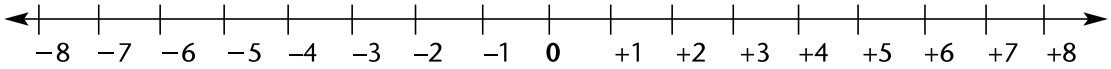
5. $x = -6$



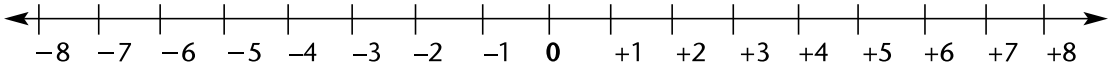
6. $x = -1$



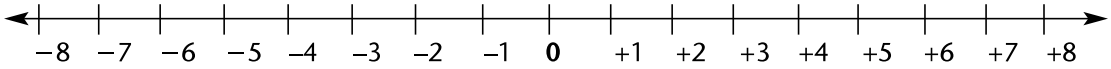
7. $x = -7$



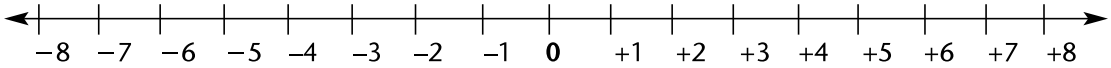
8. $x = -8$



9. $x = 0$



10. $x = 6$



Graphing Coordinates

EXAMPLE

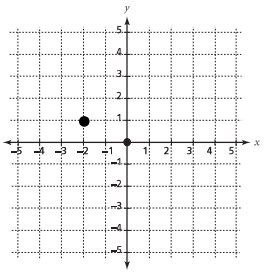
Number the *x* and *y* axes and graph the ordered pairs.

Plot (−2, 1).

Find −2 on *x* on the graph.

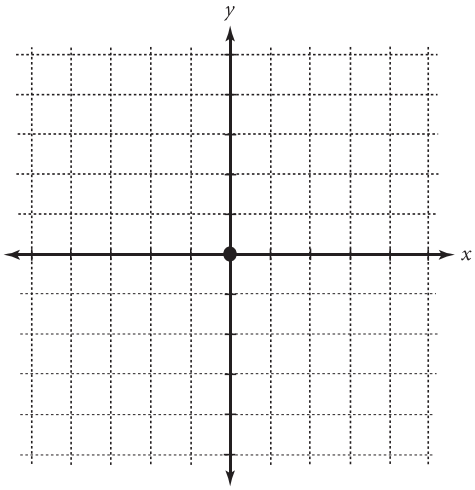
Find 1 on *y* on the graph.

Plot the point where they meet.

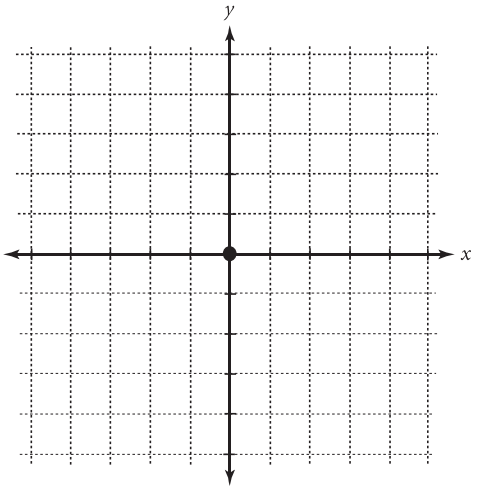


Directions Number the *x* and *y* axes and graph the ordered pairs.

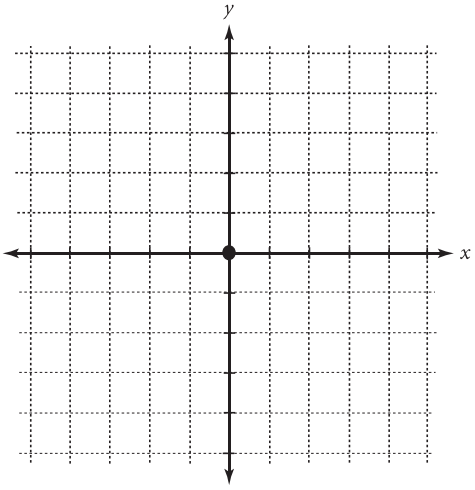
1. (−3, 4) (−5, −5) (1, 4) (0, −3) (4, 0)



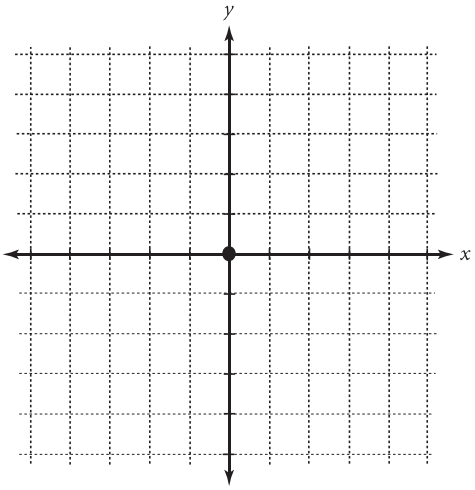
2. (2, 1) (3, −1) (−2, 5) (−4, 4) (−3, −4)



3. (2, −5) (−1, −1) (−2, 4) (5, −3) (−4, −2)



4. (0, −1) (0, 4) (−4, 0) (−1, 3) (−4, 1)



Solving Equations by Adding and Subtracting

EXAMPLE Solve the equation. $x - 19 = +2$

$$\begin{array}{r} x - 19 = +2 \\ +19 = +19 \\ \hline x + 0 = +21 \\ x = +21 \end{array}$$

Directions Solve for the variable. Show steps.

1. $x - 2 = 10$

2. $x + 2 = 12$

3. $x - 10 = 12$

4. $x - 10 = -19$

5. $x + 8 = -2$

6. $x - 10 = 20$

7. $x + 2 = -11$

8. $-3 + x = -9$

9. $4 + x = -13$

10. $y - 12 = -3$

11. $-9 + y = -23$

12. $11 = x - 10$

13. $y + 1 = -12$

14. $8 = x - 11$

15. $h - 13 = -23$

Solving Equations by Multiplying and Dividing

EXAMPLE Solve the equation. $-2x = 38$

$-2x = 38$

$\frac{-2x}{-2} = \frac{38}{-2}$

$x = -19$

Directions Solve for the variable. Show your work.

1. $4x = 20$

2. $5x = 25$

3. $7x = 56$

4. $9x = 81$

5. $8y = 72$

6. $8f = 96$

7. $12x = 144$

8. $6x = 66$

9. $\frac{x}{5} = 8$

10. $\frac{y}{3} = 9$

11. $\frac{k}{8} = 12$

12. $\frac{y}{10} = 14$

13. $-7x = 42$

14. $\frac{k}{9} = 17$

15. $\frac{x}{-8} = 20$

16. $-7x = 35$

17. $-2x = -46$

18. $\frac{x}{4} = 23$

19. $\frac{y}{-9} = 42$

20. $-3k = 30$

Two-Step Equations

EXAMPLE Solve for the variable. Subtract 3 from both sides. Then divide each side by 2.

$$\begin{array}{r} 2x + 3 = 13 \\ -3 = -3 \\ \hline 2x = 10 \end{array}$$

$$\frac{2x}{2} = \frac{10}{2}$$

$$x = 5$$

Directions Solve for the variables. Leave fractional answers as improper fractions. Show your work.

1. $3x + 4 = 14$

_____

_____

$x =$ _____

2. $3y - 2 = 19$

_____

_____

$y =$ _____

3. $3y - 8 = 16$

_____

_____

$y =$ _____

4. $2y - 5 = -37$

_____

_____

$y =$ _____

5. $6x + 1 = 27$

_____

_____

$x =$ _____

6. $8k - 2 = 70$

_____

_____

$k =$ _____

7. $6a - 1 = 22$

_____

_____

$a =$ _____

8. $9a + 1 = 82$

_____

_____

$a =$ _____

9. $7z - 2 = 22$

_____

_____

$z =$ _____

10. $3a - 2 = 42$

_____

_____

$a =$ _____

11. $4a + 1 = 35$

_____

_____

$a =$ _____

12. $-2z - 2 = 33$

_____

_____

$z =$ _____

13. $4x - 5 = 32$

_____

_____

$x =$ _____

14. $7w + 1 = 29$

_____

_____

$w =$ _____

15. $-5k - 7 = 76$

_____

_____

$k =$ _____

Combining Like Terms

EXAMPLE Combine like terms. Add the two terms. $-2a\ -4a$

$$\begin{array}{r} -2a \\ \underline{-4a} \\ -6a \end{array}$$

so $-2a\ -4a = -6a$

Directions Combine like terms.

1. $-7a - 6a$

2. $+4a - 5a$

3. $-2c - 3c\ -4c$

4. $-4v - 3v$

5. $7x + 3x - x$

6. $-x - 4x + 9x$

7. $-2x + 8x - x$

8. $+7x + 2x - 10x$

9. $-10y + 31y - y$

10. $-30f - 11f + 1$

11. $-17y + 20y - 2$

12. $4 - 8a - 3a$

13. $-x - x + 4$

14. $+4c - 7c - c$

15. $23c - 8c + c$

16. $9 - 17c + 5c$

17. $+a + a + 8$

18. $-18y + 17y + 1$

19. $-2a - 3a + 5a$

20. $12 + 12a - 24$

21. $-22 + 20y - y$

22. $+7 + 12a - 7a$

23. $3 - x - x - 2x$

24. $13x - 18x + 1$

25. $1 - 3f + 2f + 3$