

# 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.

- 3 millimeters
  - 3 meters
  - 30 meters
  - 0.03 meters
  - 0.003 meters
- 7 kilometers
  - 70 meters
  - 700 meters
  - 7,000 meters
  - 0.007 meters
- 8 centimeters
  - 0.08 meters
  - 0.8 meters
  - 80 meters
  - 8 meters
- 9 dekameters
  - 9 meters
  - 90 meters
  - 0.09 meters
  - 900 meters
- 4 hectometers
  - 40 meters
  - 0.04 meters
  - 0.004 meters
  - 400 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 decimeters
  - 3 meters
  - 0.3 meters
  - 0.03 meters
  - 30 meters
- 7 decimeters
  - 0.7 meters
  - 0.07 meters
  - 70 meters
  - 700 meters
- 19 kilometers
  - 190 meters
  - 0.0019 meters
  - 1,900 meters
  - 19,000 meters
- 3,000 millimeters
  - 300 meters
  - 30 meters
  - 3 meters
  - 0.03 meters
- 27 centimeters
  - 2.7 meters
  - 0.27 meters
  - 0.027 meters
  - 27 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**

$$4.5 \text{ m} = \underline{450} \text{ cm}$$

2 places →

$$\text{km } \underline{3} \text{ m } \underline{2} \text{ cm } \underline{1} \text{ mm}$$

→

$$6.2 \text{ cm} = \underline{0.000062} \text{ km}$$

← 5 places

$$\text{km } \underline{3} \text{ m } \underline{2} \text{ cm } \underline{1} \text{ mm}$$

←

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.  $5 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$

2.  $2 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

3.  $12 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

4.  $9 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

5.  $2.3 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

6.  $3.44 \text{ km} = \underline{\hspace{2cm}} \text{ cm}$

7.  $19 \text{ mm} = \underline{\hspace{2cm}} \text{ cm}$

8.  $7.1 \text{ cm} = \underline{\hspace{2cm}} \text{ km}$

9.  $2 \text{ cm} = \underline{\hspace{2cm}} \text{ m}$

10.  $0.04 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

1 kilometer = 1,000 meters

1 meter = 100 centimeters

1 meter = 1,000 millimeters

1 centimeter = 10 millimeters

11.  $29,000 \text{ mm} = \underline{\hspace{2cm}} \text{ m}$

12.  $9,000,000 \text{ mm} = \underline{\hspace{2cm}} \text{ km}$

13.  $0.0003 \text{ cm} = \underline{\hspace{2cm}} \text{ km}$

14.  $0.004 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

15.  $82 \text{ mm} = \underline{\hspace{2cm}} \text{ m}$

## Working with Measurements of Length

**EXAMPLE**

Add. Convert meters to centimeters.

$$2 \text{ m} + 350 \text{ cm}$$

$$200 \text{ m} + 350 \text{ cm} = 550 \text{ cm}$$

**Directions** Use the charts to help make these conversions.

km <u>  3  </u> m <u>  2  </u> cm <u>  1  </u> mm
---

1.  $234 \text{ mm} = \underline{\hspace{2cm}}$  cm

2.  $82 \text{ m} = \underline{\hspace{2cm}}$  km

3.  $3.4 \text{ mm} = \underline{\hspace{2cm}}$  m

4.  $5 \text{ km} = \underline{\hspace{2cm}}$  cm

5.  $35 \text{ cm} = \underline{\hspace{2cm}}$  mm

6.  $87 \text{ mm} = \underline{\hspace{2cm}}$  km

7.  $3.2 \text{ cm} = \underline{\hspace{2cm}}$  mm

8.  $0.24 \text{ km} = \underline{\hspace{2cm}}$  m

1 kilometer = 1,000 meters

1 meter = 100 centimeters

1 meter = 1,000 millimeters

1 centimeter = 10 millimeters

9.  $0.7 \text{ mm} = \underline{\hspace{2cm}}$  cm

10.  $0.001 \text{ km} = \underline{\hspace{2cm}}$  m

11.  $15 \text{ cm} = \underline{\hspace{2cm}}$  m

12.  $0.02 \text{ m} = \underline{\hspace{2cm}}$  cm

**Directions** Find the answers to these addition problems.

13.  $34 \text{ cm} + 4.9 \text{ cm} + 7 \text{ cm} = \underline{\hspace{2cm}}$  cm

20.  $1 \text{ cm} + 1 \text{ m} = \underline{\hspace{2cm}}$  m

14.  $9 \text{ mm} + 22 \text{ mm} = \underline{\hspace{2cm}}$  mm

21.  $9 \text{ mm} + 30 \text{ mm} + 1.1 \text{ cm} = \underline{\hspace{2cm}}$  mm

15.  $66 \text{ m} + 120 \text{ cm} + 10 \text{ m} = \underline{\hspace{2cm}}$  m

22.  $8 \text{ km} + 2,031 \text{ m} = \underline{\hspace{2cm}}$  km

16.  $4 \text{ km} + 5 \text{ m} + 120 \text{ cm} = \underline{\hspace{2cm}}$  m

23.  $30 \text{ m} + 20 \text{ cm} = \underline{\hspace{2cm}}$  km

17.  $3.4 \text{ cm} + 12 \text{ mm} + 4 \text{ mm} = \underline{\hspace{2cm}}$  mm

24.  $0.003 \text{ km} + 2 \text{ m} = \underline{\hspace{2cm}}$  cm

18.  $2 \text{ km} + 23 \text{ m} + 300 \text{ cm} = \underline{\hspace{2cm}}$  m

25.  $4 \text{ mm} + 30 \text{ cm} = \underline{\hspace{2cm}}$  mm

19.  $4 \text{ m} + 34 \text{ m} + 0.005 \text{ km} = \underline{\hspace{2cm}}$  m



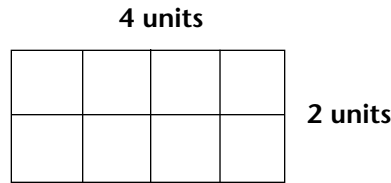
## Computing Area of a Rectangle

**EXAMPLE**

$$\text{Area} = \text{length} \times \text{width}$$

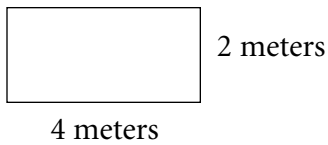
$$\text{Area} = 4 \text{ units} \times 2 \text{ units}$$

$$\text{Area} = 8 \text{ square units}$$



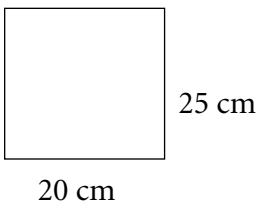
**Directions** Solve for the area of these rectangles.

1.



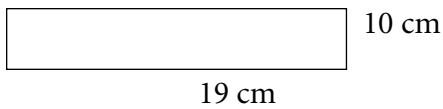
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2.



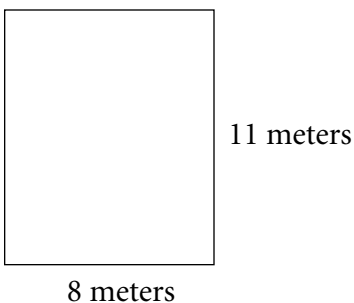
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3.



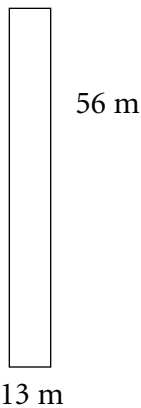
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4.



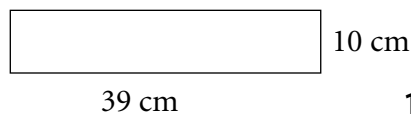
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5.



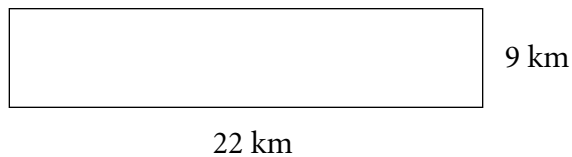
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6.



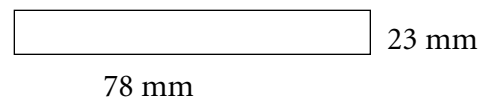
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7.



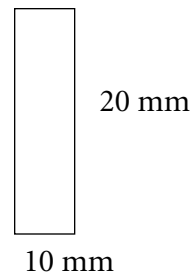
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8.



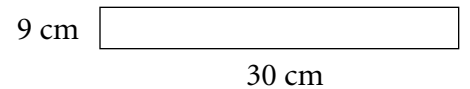
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9.



\_\_\_\_\_

10.



\_\_\_\_\_

## Computing Volume

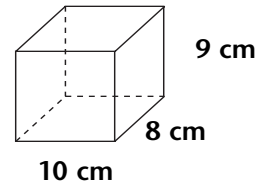
**EXAMPLE**

Compute the volume for this rectangular prism.

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

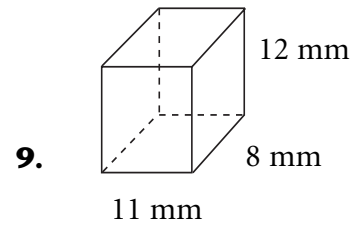
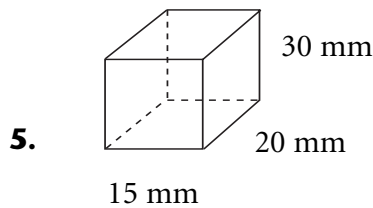
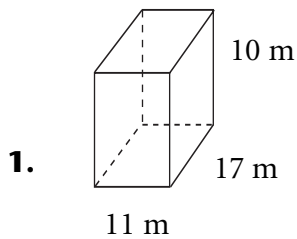
$$\text{Volume} = 10 \text{ cm} \times 8 \text{ cm} \times 9 \text{ cm}$$

$$\text{Volume} = 720 \text{ cubic cm}$$



All volume measurements are expressed in cubic units.

**Directions** Compute the volumes.



**2.** length = 1 km  
width = 2 km  
height = 5 km  
\_\_\_\_\_

**6.** length = 12 cm  
width = 20 cm  
height = 6 cm  
\_\_\_\_\_

**10.** length = 45 cm  
width = 17 cm  
height = 10 cm  
\_\_\_\_\_

**3.** length = 13 cm  
width = 8 cm  
height = 20 cm  
\_\_\_\_\_

**7.** length = 100 m  
width = 100 m  
height = 10 m  
\_\_\_\_\_

**4.** length = 22 km  
width = 22 km  
height = 10 km  
\_\_\_\_\_

**8.** length = 25 km  
width = 20 km  
height = 40 km  
\_\_\_\_\_

# 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

\_\_\_\_\_

**6.** automobile gas tank

\_\_\_\_\_

**2.** the amount of water in a swimming pool

\_\_\_\_\_

**7.** the amount of salt needed

\_\_\_\_\_

**3.** the amount of cream in a bowl

\_\_\_\_\_

**8.** a bottle of perfume

\_\_\_\_\_

**4.** milk shake in a paper cup

\_\_\_\_\_

**9.** a thimble full of water

\_\_\_\_\_

**5.** trunk space of a large car

\_\_\_\_\_

**10.** a bathtub full of water

\_\_\_\_\_

**Directions** Make these conversions using the table.

**11.** 2 kiloliters = \_\_\_\_\_ liters

**16.** 200 centiliters = \_\_\_\_\_ milliliters

**12.** 2,000 liters = \_\_\_\_\_ kiloliters

**17.** 1 kL = \_\_\_\_\_ L

**13.** 300 milliliters = \_\_\_\_\_ cL

**18.** 30 mL = \_\_\_\_\_ centiliters

**14.** 400 mL = \_\_\_\_\_ liters

**19.** 10 L = \_\_\_\_\_ cL

**15.** 9 kL = \_\_\_\_\_ L

**20.** 40 cL = \_\_\_\_\_ mL



## Units of Capacity

**EXAMPLE**

 kL 3 L 2 cL 1 mL

$$2,200 \text{ mL} = \underline{\quad} \text{ L}$$

$$1,000 \text{ mL} = 1 \text{ L, so}$$

$$2,200 \text{ mL} = \underline{2.2} \text{ L}$$

**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.**  $4,500 \text{ mL} = \underline{\quad\quad\quad} \text{ L}$

**4.**  $3.6 \text{ L} = \underline{\quad\quad\quad} \text{ kL}$

**2.**  $0.00012 \text{ kL} = \underline{\quad\quad\quad} \text{ L}$

**5.**  $0.091 \text{ mL} = \underline{\quad\quad\quad} \text{ cL}$

**3.**  $2.3 \text{ L} = \underline{\quad\quad\quad} \text{ mL}$

**6.**  $7 \text{ mL} = \underline{\quad\quad\quad} \text{ L}$

**Directions** Solve for the volumes.

**7.** length = 2 mm

width = 3 mm

height = 4 mm

volume =  $\underline{\quad\quad\quad} \text{ mm}^3$

**10.** length = 1 m

width = 1 m

height = 50 cm

volume =  $\underline{\quad\quad\quad} \text{ cm}^3$

**13.** length = 3 km

width = 10 km

height = 1 km

volume =  $\underline{\quad\quad\quad} \text{ km}^3$

**8.** length = 8 cm

width = 5 cm

height = 9 cm

volume =  $\underline{\quad\quad\quad} \text{ cm}^3$

**11.** length = 4 mm

width = 20 mm

height = 1 cm

volume =  $\underline{\quad\quad\quad} \text{ mm}^3$

**14.** length = 90 cm

width = 300 cm

height = 1 m

volume =  $\underline{\quad\quad\quad} \text{ cm}^3$

**9.** length = 12 m

width = 4 m

height = 1 m

volume =  $\underline{\quad\quad\quad} \text{ m}^3$

**12.** length = 2.3 cm

width = 100 cm

height = 20 mm

volume =  $\underline{\quad\quad\quad} \text{ cm}^3$

**15.** length = 45 mm

width = 2 cm

height = 20 cm

volume =  $\underline{\quad\quad\quad} \text{ cm}^3$





# 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.

- |   |   |   |
|---|---|---|
| <b>1.</b> a pencil<br>mg    g    kg             | <b>11.</b> a toothpick<br>mg    g    kg     | <b>21.</b> a large turkey<br>mg    g    kg          |
| <b>2.</b> a grape<br>mg    g    kg              | <b>12.</b> one large steak<br>mg    g    kg | <b>22.</b> a ballpoint pen<br>mg    g    kg         |
| <b>3.</b> a sunflower seed<br>mg    g    kg     | <b>13.</b> a large cow<br>mg    g    kg     | <b>23.</b> a plate full of chicken<br>mg    g    kg |
| <b>4.</b> a small child<br>mg    g    kg        | <b>14.</b> a small cow<br>mg    g    kg     | <b>24.</b> one large shoe<br>mg    g    kg          |
| <b>5.</b> an automobile<br>mg    g    kg        | <b>15.</b> a sheep<br>mg    g    kg         | <b>25.</b> one carrot<br>mg    g    kg              |
| <b>6.</b> a soup bowl<br>mg    g    kg          | <b>16.</b> a 17-inch TV<br>mg    g    kg    | <b>26.</b> an egg sandwich<br>mg    g    kg         |
| <b>7.</b> a textbook<br>mg    g    kg           | <b>17.</b> a sandwich<br>mg    g    kg      | <b>27.</b> a bike<br>mg    g    kg                  |
| <b>8.</b> a tube of toothpaste<br>mg    g    kg | <b>18.</b> a tomato<br>mg    g    kg        | <b>28.</b> one peanut<br>mg    g    kg              |
| <b>9.</b> a box of cereal<br>mg    g    kg      | <b>19.</b> a can of soup<br>mg    g    kg   | <b>29.</b> one grain of salt<br>mg    g    kg       |
| <b>10.</b> an apple<br>mg    g    kg            | <b>20.</b> a kitchen table<br>mg    g    kg | <b>30.</b> a train<br>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. 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

<b>1 kilogram = 1,000 grams</b> <b>1 gram = 100 centigrams</b> <b>1 centigram = 10 milligrams</b> <b>1 gram = 1,000 milligrams</b>
---

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.  $6 \times 16 = 96$

**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

8. 10 gallons = \_\_\_\_\_ quarts

2. 4 quarts = \_\_\_\_\_ pints

9. 20 quarts = \_\_\_\_\_ pints

3. 4 gallons = \_\_\_\_\_ quarts

10. 13 quarts = \_\_\_\_\_ pints

4. 3 pints = \_\_\_\_\_ fluid ounces

11. 20 quarts = \_\_\_\_\_ fluid ounces

5. 5 quarts = \_\_\_\_\_ pints

12. 3 gallons = \_\_\_\_\_ pints

6. 2 gallons = \_\_\_\_\_ quarts

13. 4 quarts = \_\_\_\_\_ fluid ounces

7. 5 pints = \_\_\_\_\_ 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

20. 12 pints = \_\_\_\_\_ quarts

15. 14 quarts = \_\_\_\_\_ gallons

21. 34 quarts = \_\_\_\_\_ gallons

16. 48 fluid ounces = \_\_\_\_\_ pints

22. 45 fluid ounces = \_\_\_\_\_ pints

17. 22 pints = \_\_\_\_\_ quarts

23. 80 quarts = \_\_\_\_\_ gallons

18. 32 pints = \_\_\_\_\_ quarts

24. 56 fluid ounces = \_\_\_\_\_ pints

19. 30 quarts = \_\_\_\_\_ gallons

25. 23 pints = \_\_\_\_\_ quarts



## Converting Units of Weight

**EXAMPLES**

Multiply or divide to convert units.

$$2 \text{ tons} = \underline{\hspace{2cm}} \text{ pounds}$$

$$2 \times 2,000 = 4,000 \text{ pounds}$$

$$3,000 \text{ pounds} = \underline{\hspace{2cm}} \text{ tons}$$

$$3,000 \div 2,000 = 1 \frac{1}{2} \text{ tons}$$

**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

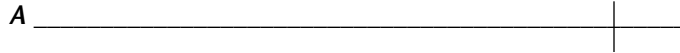
## Measuring Lengths

**EXAMPLE**

Use a ruler to measure the length.

Draw a vertical rule. Label it  $B$ .

$$\overline{AB} = 3 \text{ inches}$$



**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.

$$4 \text{ feet} = \underline{\hspace{2cm}} \text{ inches}$$

$$4 \times 12 = 48$$

$$\swarrow \quad \searrow$$

$$12 \text{ inches} = 1 \text{ foot}$$

$$4 \text{ feet} = \underline{48} \text{ inches}$$

$$120 \text{ inches} = \underline{\hspace{2cm}} \text{ feet}$$

$$120 \div 12 = 10$$

$$\swarrow \quad \searrow$$

$$12 \text{ inches} = 1 \text{ foot}$$

$$120 \text{ inches} = \underline{10} \text{ feet}$$

**Directions** Use the chart and multiply to make these conversions.

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

**1 foot = 12 inches**

**1 yard = 36 inches**

**1 yard = 3 feet**

**1 mile = 5,280 feet**

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.

$$\begin{array}{r} 3 \text{ feet } 5 \text{ inches} \\ + 7 \text{ feet } 9 \text{ inches} \\ \hline 10 \text{ feet } 14 \text{ inches} \\ \text{or} \\ 11 \text{ feet } 2 \text{ inches} \end{array}$$

Subtract.

$$\begin{array}{r} \phantom{5} \phantom{17} \\ 8 \text{ feet } 8 \text{ inches} \\ - 2 \text{ feet } 9 \text{ inches} \\ \hline 3 \text{ feet } 8 \text{ inches} \end{array}$$

Multiply.

$$\begin{array}{r} 2 \text{ feet } 3 \text{ inches} \\ \times \phantom{2} 6 \\ \hline 12 \text{ feet } 18 \text{ inches} \\ \text{or} \\ 13 \text{ feet } 6 \text{ inches} \end{array}$$

Divide.

$$\begin{array}{l} 12 \text{ yards } 6 \text{ feet } 10 \text{ inches} \div 2 = \\ \frac{12 \text{ yards}}{2} \quad \frac{6 \text{ feet}}{2} \quad \frac{10 \text{ inches}}{2} = \\ 6 \text{ yards } 3 \text{ feet } 5 \text{ inches} \end{array}$$

**Directions** Add these units of measure and simplify answers.

- 4 yards 3 feet  
+ 2 yards 4 feet
- 8 feet 11 inches  
+ 2 feet 5 inches
- 5 feet 6 inches + 6 feet 2 inches
- 7 yards 6 feet + 4 yards 6 feet
- 6 yards 11 inches + 5 yards 9 inches

**Directions** Subtract these units of measure. Simplify the answers.

- 12 yards 2 feet  
- 3 yards 3 feet
- 9 feet 11 inches  
- 2 feet 9 inches
- 2 yards 2 feet - 4 feet = \_\_\_\_\_
- 8 feet 6 inches - 3 feet 9 inches = \_\_\_\_\_
- 1 foot 4 inches - 9 inches = \_\_\_\_\_

**Directions** Multiply these measurements.

- 4 yards 1 foot 3 inches  
 $\times$  \_\_\_\_\_ 4 \_\_\_\_\_
- 10 feet 5 inches  
 $\times$  \_\_\_\_\_ 3 \_\_\_\_\_
- $2 \times (3 \text{ feet } 2 \text{ inches}) =$  \_\_\_\_\_
- $3 \times (3 \text{ yards } 2 \text{ feet } 7 \text{ inches}) =$  \_\_\_\_\_
- $8 \times (7 \text{ yards } 3 \text{ feet}) =$  \_\_\_\_\_

**Directions** Divide these measurements.

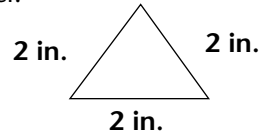
- $(18 \text{ yards } 24 \text{ feet } 9 \text{ inches}) \div 3 =$  \_\_\_\_\_
- $(24 \text{ yards } 8 \text{ feet } 16 \text{ inches}) \div 8 =$  \_\_\_\_\_
- $(4 \text{ yards } 2 \text{ feet } 8 \text{ inches}) \div 2 =$  \_\_\_\_\_
- $(25 \text{ yards } 15 \text{ feet } 5 \text{ inches}) \div 5 =$  \_\_\_\_\_
- $(66 \text{ yards } 33 \text{ feet } 11 \text{ inches}) \div 11 =$  \_\_\_\_\_

# Perimeter

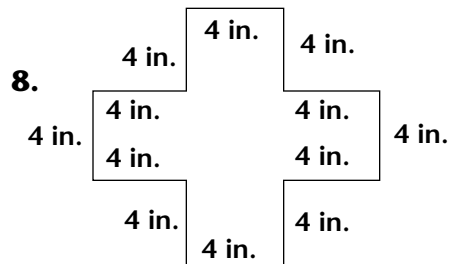
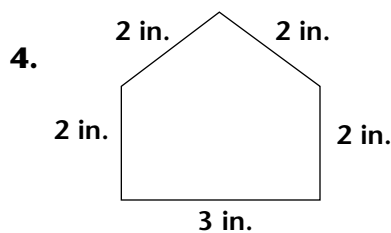
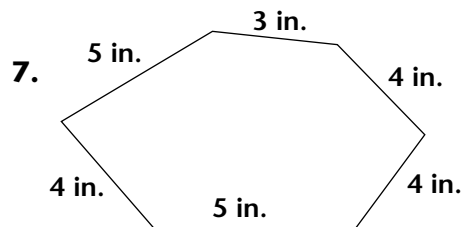
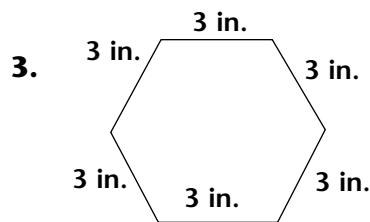
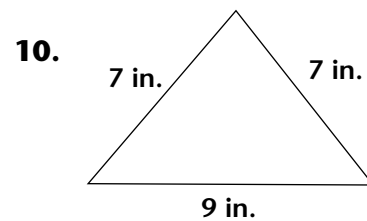
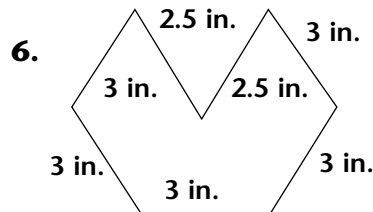
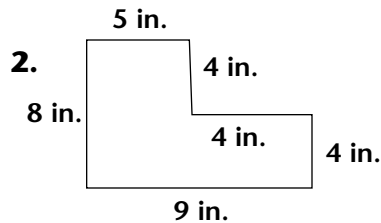
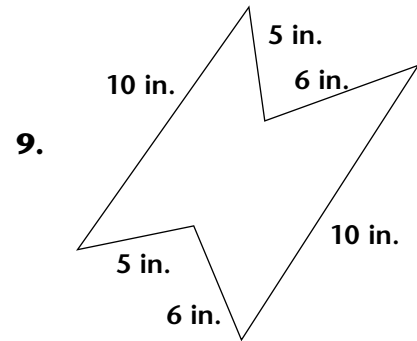
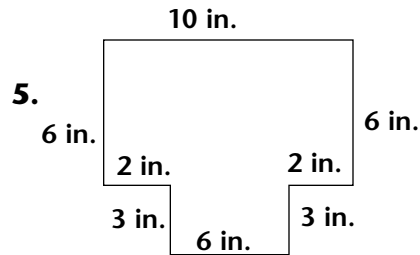
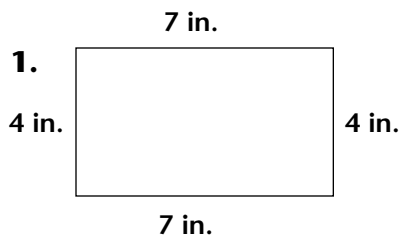
**EXAMPLE**

Add the lengths of all sides to get perimeter.

$$2 + 2 + 2 = 6 \text{ in.}$$



**Directions** Find the perimeter of each shape.



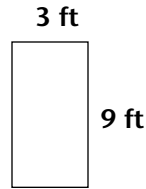


# Area

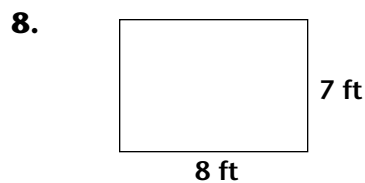
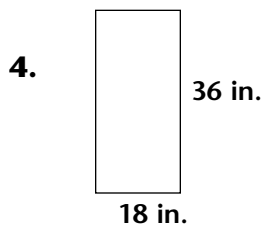
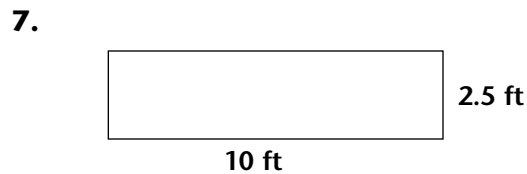
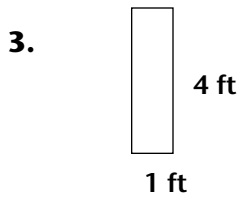
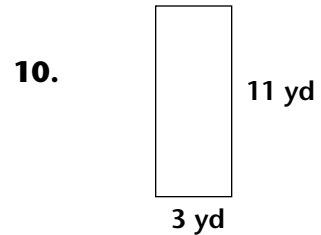
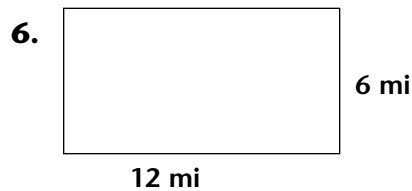
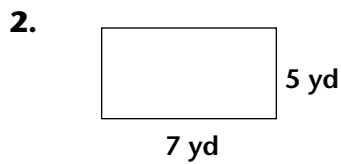
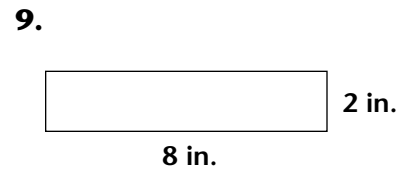
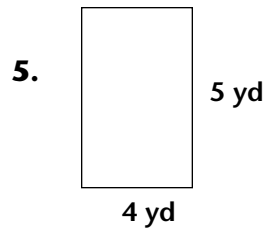
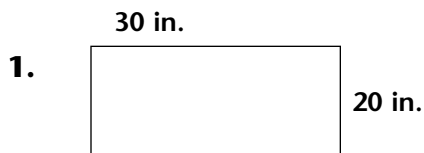
**EXAMPLE**

Multiply length by width to find the area.

$$\begin{aligned} L \times W &= A \\ 9 \times 3 &= A \\ 27 \text{ square feet} &= A \end{aligned}$$



**Directions** Find the area of each rectangle.



## Area of Triangles

**EXAMPLE**

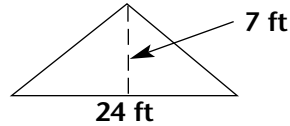
Find the area of a triangle whose base is 24 feet and height is 7 feet.

$$\text{Area} = \frac{1}{2} \text{ base} \times \text{height}$$

$$A = \frac{1}{2} (24) \times 7$$

$$A = 12 \times 7$$

$$A = 84 \text{ square feet}$$



**Directions** Find the area of each triangle described below.

- |   |       |   |       |
|---|-------|---|-------|
| 1. base = 16 feet<br>height = 6 feet      | _____ | 11. base = 6 inches<br>height = 17 inches                     | _____ |
| 2. base = 41 feet<br>height = 32 feet     | _____ | 12. base = 3 yards<br>height = 20 yards                       | _____ |
| 3. base = 40 feet<br>height = 10 feet     | _____ | 13. base = $\frac{2}{3}$ inch<br>height = 12 inches           | _____ |
| 4. base = 50 feet<br>height = 12 feet     | _____ | 14. base = $\frac{3}{4}$ foot<br>height = 16 feet             | _____ |
| 5. base = 12 feet<br>height = 10 feet     | _____ | 15. base = $1\frac{1}{8}$ inches<br>height = 6 inches         | _____ |
| 6. base = 5 feet<br>height = 4 feet       | _____ | 16. base = 10 yards<br>height = $4\frac{1}{2}$ yards          | _____ |
| 7. base = 20 inches<br>height = 10 inches | _____ | 17. base = 20 yards<br>height = 5 yards                       | _____ |
| 8. base = 33 inches<br>height = 50 inches | _____ | 18. base = 10 feet<br>height = 2 feet                         | _____ |
| 9. base = 9 yards<br>height = 18 yards    | _____ | 19. base = $\frac{1}{2}$ inch<br>height = $\frac{1}{16}$ inch | _____ |
| 10. base = 10 yards<br>height = 15 yards  | _____ | 20. base = $1\frac{1}{16}$ inches<br>height = 6 inches        | _____ |

## Area of Parallelograms

**EXAMPLE**

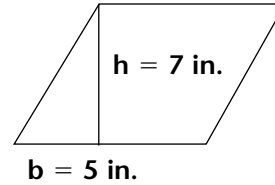
To find area of a parallelogram, multiply base by height.

$$\text{Area} = \text{base} \times \text{height}$$

$$A = bh \quad b = 5 \text{ in.} \quad h = 7 \text{ in.}$$

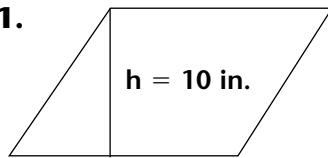
$$A = 5 \times 7$$

$$A = 35 \text{ square inches}$$



**Directions** Find the area of each parallelogram.

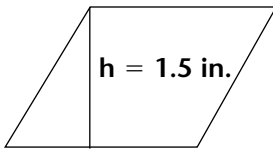
1.



$$b = 12 \text{ in.}$$

$$\text{Area} = \underline{\hspace{2cm}}$$

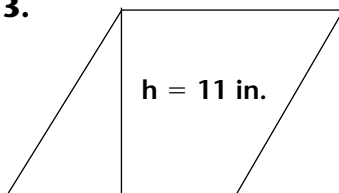
2.



$$b = 4 \text{ in.}$$

$$\text{Area} = \underline{\hspace{2cm}}$$

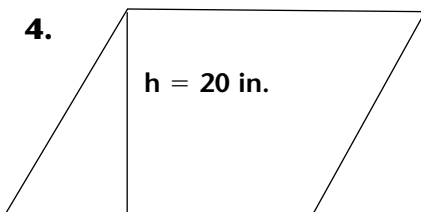
3.



$$b = 12 \text{ in.}$$

$$\text{Area} = \underline{\hspace{2cm}}$$

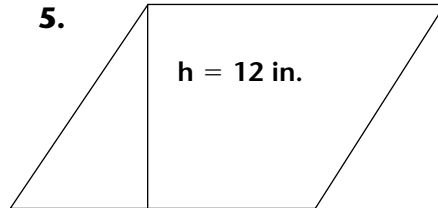
4.



$$b = 22 \text{ in.}$$

$$\text{Area} = \underline{\hspace{2cm}}$$

5.



$$b = 17 \text{ in.}$$

$$\text{Area} = \underline{\hspace{2cm}}$$

6.

base = 20 feet  
height = 30 feet

$$\text{Area} = \underline{\hspace{2cm}}$$

7.

base = 34 yards  
height = 10 yards

$$\text{Area} = \underline{\hspace{2cm}}$$

8.

base = 4 inches  
height = 14 inches

$$\text{Area} = \underline{\hspace{2cm}}$$

9.

base = 12 feet  
height = 6 feet

$$\text{Area} = \underline{\hspace{2cm}}$$

10.

base = 21 miles  
height = 2 miles

$$\text{Area} = \underline{\hspace{2cm}}$$

11.

base = 1 foot  
height = 1 foot

$$\text{Area} = \underline{\hspace{2cm}}$$

12.

base = 14 inches  
height = 1 foot

$$\text{Area} = \underline{\hspace{2cm}}$$

13.

base = 4.5 inches  
height = 4 inches

$$\text{Area} = \underline{\hspace{2cm}}$$

14.

base = 5 inches  
height = 1 foot

$$\text{Area} = \underline{\hspace{2cm}}$$

15.

base = 3 yards  
height = 4 feet

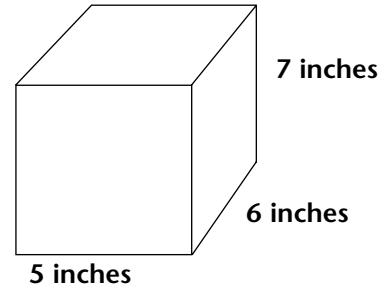
$$\text{Area} = \underline{\hspace{2cm}}$$

## Volume of Rectangular Prisms

**EXAMPLE**

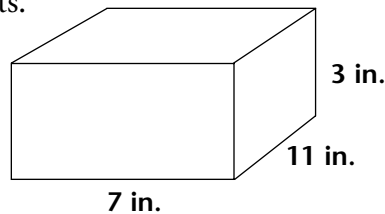
Multiply length by width by height to find volume.

$$\begin{aligned} \text{Volume} &= \text{area of base} \times \text{height} \\ &= \text{length} \times \text{width} \times \text{height} \\ &= 5 \text{ in.} \times 6 \text{ in.} \times 7 \text{ in.} \\ &= 30 \text{ square inches} \times 7 \text{ in.} \\ &= 210 \text{ cubic inches} \end{aligned}$$



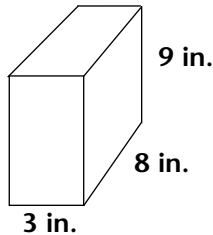
**Directions** Compute the volume for these prisms. Express your answers in cubic units.

1.



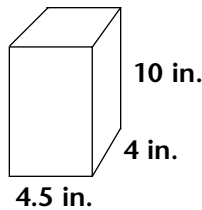
Volume = \_\_\_\_\_

2.



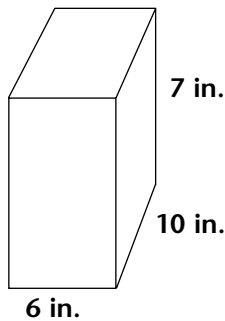
Volume = \_\_\_\_\_

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.

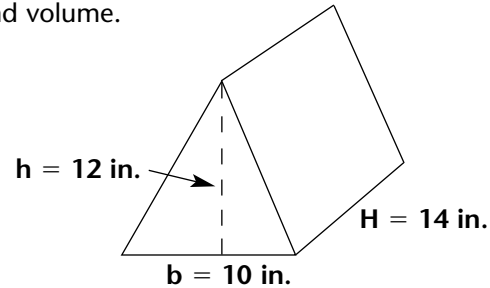
Volume = \_\_\_\_\_

## Volume of Triangular Prisms

**EXAMPLE**

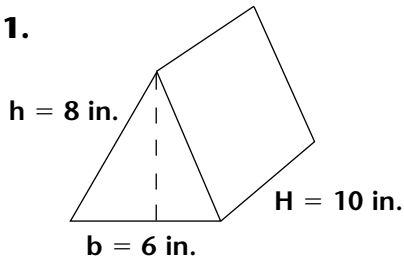
Multiply  $\frac{1}{2}$  area of base by height to find volume.

$$\begin{aligned} \text{Volume} &= \frac{1}{2} (\text{base} \times \text{height}) \text{ Height} \\ &= \frac{1}{2} (10 \times 12) \times 14 \\ &= \frac{1}{2} (120) \times 14 \\ &= 60 \times 14 \\ &= 840 \text{ cubic inches} \end{aligned}$$



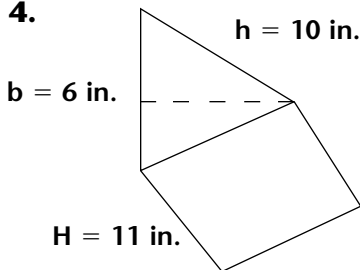
**Directions** Find the volume of these triangular prisms.

1.



Volume = \_\_\_\_\_

4.

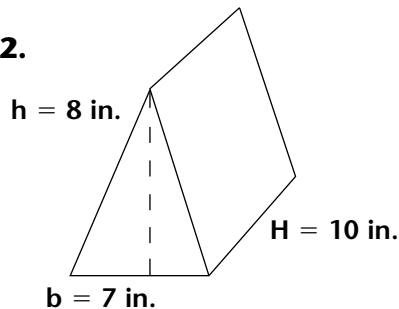


Volume = \_\_\_\_\_

7. base = 30 inches  
height = 10 inches  
Height = 15 inches

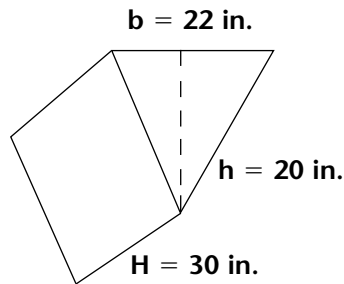
Volume = \_\_\_\_\_

2.



Volume = \_\_\_\_\_

5.



Volume = \_\_\_\_\_

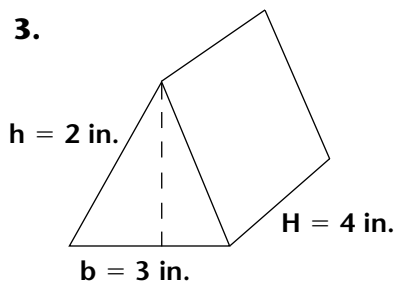
8. base = 40 inches  
height = 10 inches  
Height = 20 inches

Volume = \_\_\_\_\_

9. base = 16 inches  
height = 12 inches  
Height = 22 inches

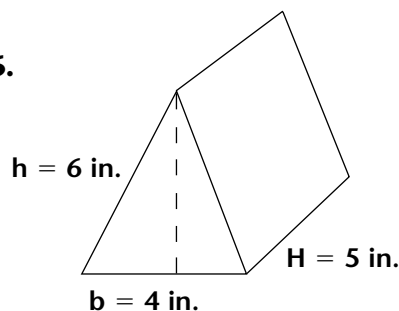
Volume = \_\_\_\_\_

3.



Volume = \_\_\_\_\_

6.



Volume = \_\_\_\_\_

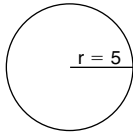
10. base = 20 inches  
height = 15 inches  
Height = 17 inches

Volume = \_\_\_\_\_

## Finding Circumference

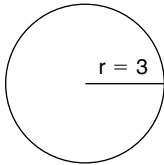
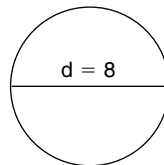
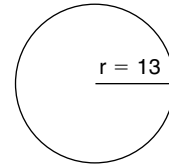
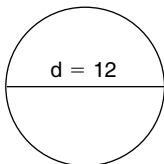
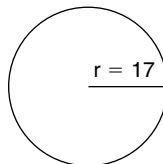
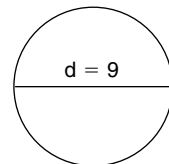
**EXAMPLE**

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.**

 $C = \underline{\hspace{2cm}}$ 
**3.**

 $C = \underline{\hspace{2cm}}$ 
**5.**

 $C = \underline{\hspace{2cm}}$ 
**2.**

 $C = \underline{\hspace{2cm}}$ 
**4.**

 $C = \underline{\hspace{2cm}}$ 
**6.**

 $C = \underline{\hspace{2cm}}$ 
**7.** diameter = 22

Circumference = \_\_\_\_\_

**9.** radius = 16

Circumference = \_\_\_\_\_

**8.** diameter = 25

Circumference = \_\_\_\_\_

**10.** radius = 20

Circumference = \_\_\_\_\_

## Area and Circumference of Circles

**EXAMPLES**

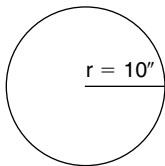
Find the area and circumference of a circle with a radius of 5 inches.

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= 3.14 \times 5^2 \\ &= 3.14 \times 25 \\ &= 78.50 \text{ square inches} \end{aligned}$$

$$\begin{aligned} \text{Circumference} &= 2 \pi r \\ &= 2 \times 3.14 \times 5 \\ &= 31.4 \text{ inches} \end{aligned}$$

**Directions** Solve for the area and circumference for each circle.  
Use 3.14 for  $\pi$ . The abbreviation for circumference is C.

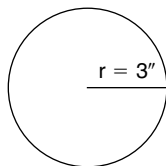
1.



Area = \_\_\_\_\_

C = \_\_\_\_\_

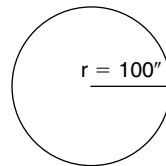
5.



Area = \_\_\_\_\_

C = \_\_\_\_\_

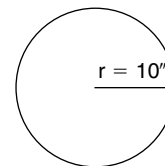
9.



Area = \_\_\_\_\_

C = \_\_\_\_\_

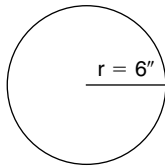
13.



Area = \_\_\_\_\_

C = \_\_\_\_\_

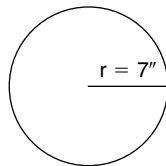
2.



Area = \_\_\_\_\_

C = \_\_\_\_\_

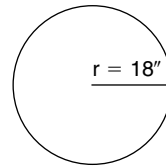
6.



Area = \_\_\_\_\_

C = \_\_\_\_\_

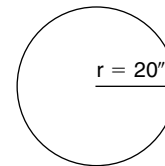
10.



Area = \_\_\_\_\_

C = \_\_\_\_\_

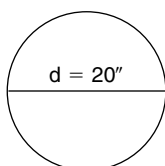
14.



Area = \_\_\_\_\_

C = \_\_\_\_\_

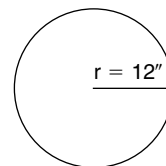
3.



Area = \_\_\_\_\_

C = \_\_\_\_\_

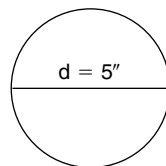
7.



Area = \_\_\_\_\_

C = \_\_\_\_\_

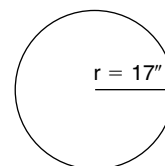
11.



Area = \_\_\_\_\_

C = \_\_\_\_\_

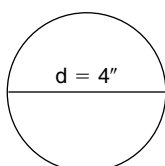
15.



Area = \_\_\_\_\_

C = \_\_\_\_\_

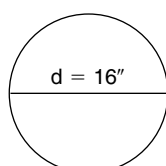
4.



Area = \_\_\_\_\_

C = \_\_\_\_\_

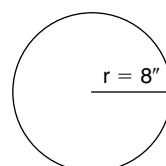
8.



Area = \_\_\_\_\_

C = \_\_\_\_\_

12.



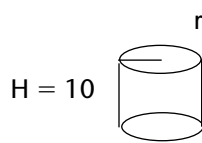
Area = \_\_\_\_\_

C = \_\_\_\_\_

## Volume of a Cylinder

**EXAMPLE**

$$\text{Volume} = \pi r^2 H$$

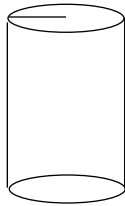


$$\begin{aligned} \text{Volume} &= \pi \times 3^2 \times 10 \\ &= 3.14 \times 9 \times 10 \\ &= 3.14 \times 90 \\ &= 282.6 \text{ cubic units} \end{aligned}$$

Remember volume is expressed as cubic units.

**Directions** Find the volume for each cylinder.

1.



$r = 11$   
 $H = 20$

$$V = \underline{\hspace{2cm}}$$

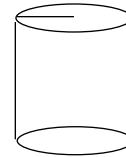
3.



$r = 12$   
 $H = 30$

$$V = \underline{\hspace{2cm}}$$

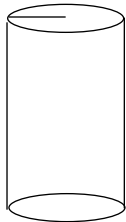
5.



$r = 1$   
 $H = 10$

$$V = \underline{\hspace{2cm}}$$

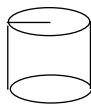
2.



$r = 3$   
 $H = 20$

$$V = \underline{\hspace{2cm}}$$

4.



$r = 9$   
 $H = 2$

$$V = \underline{\hspace{2cm}}$$

6.



$r = 11$   
 $H = 2$

$$V = \underline{\hspace{2cm}}$$

7. radius = 11

height = 10

Volume = \_\_\_\_\_

9. radius = 20

height = 22

Volume = \_\_\_\_\_

8. radius = 10

height = 15

Volume = \_\_\_\_\_

10. radius = 8

height = 18

Volume = \_\_\_\_\_



## Units of Time

**EXAMPLE**

Add.

$$\begin{array}{r} 5 \text{ weeks } 3 \text{ days} \\ + \quad \quad \quad 4 \text{ days} \\ \hline 5 \text{ weeks } 7 \text{ days} = 6 \text{ weeks} \end{array}$$

**Directions** Perform the indicated operations. Simplify the answers.

**1.**  $\begin{array}{r} 6 \text{ weeks } 4 \text{ days} \\ + \quad \quad \quad 4 \text{ days} \\ \hline \end{array}$

**8.**  $\begin{array}{r} 10 \text{ years } 2 \text{ weeks } 1 \text{ day} \\ - 8 \text{ years } 5 \text{ weeks } 4 \text{ days} \\ \hline \end{array}$

**2.**  $\begin{array}{r} 3 \text{ years } 2 \text{ weeks } 6 \text{ days} \\ + 2 \text{ years } 6 \text{ weeks } 3 \text{ days} \\ \hline \end{array}$

**9.**  $\begin{array}{r} 3 \text{ days } 12 \text{ hours } 10 \text{ min} \\ + 3 \text{ days } 7 \text{ hours } 56 \text{ min} \\ \hline \end{array}$

**3.**  $\begin{array}{r} 7 \text{ weeks } 4 \text{ days} \\ + 2 \text{ weeks } 5 \text{ days} \\ \hline \end{array}$

**10.**  $\begin{array}{r} 5 \text{ hours } 10 \text{ min } 5 \text{ sec} \\ + 8 \text{ hours } 50 \text{ min } 58 \text{ sec} \\ \hline \end{array}$

**4.**  $\begin{array}{r} 9 \text{ weeks } 5 \text{ days} \\ - 7 \text{ weeks } 6 \text{ days} \\ \hline \end{array}$

**11.**  $\begin{array}{r} 2 \text{ hours } 20 \text{ min } 4 \text{ sec} \\ - 1 \text{ hour } 10 \text{ min } 7 \text{ sec} \\ \hline \end{array}$

**5.**  $\begin{array}{r} 8 \text{ years } 6 \text{ weeks } 3 \text{ days} \\ - 3 \text{ years } 5 \text{ weeks } 6 \text{ days} \\ \hline \end{array}$

**12.**  $\begin{array}{r} 4 \text{ hours } 10 \text{ min } 5 \text{ sec} \\ - 3 \text{ hours } 9 \text{ min } 5 \text{ sec} \\ \hline \end{array}$

**6.**  $\begin{array}{r} 5 \text{ weeks } 3 \text{ days} \\ - \quad \quad \quad 6 \text{ days} \\ \hline \end{array}$

**13.**  $\begin{array}{r} 3 \text{ hours } 2 \text{ min} \\ - 2 \text{ hours } 8 \text{ min} \\ \hline \end{array}$

**7.**  $\begin{array}{r} 15 \text{ years } 9 \text{ weeks} \\ - 7 \text{ years } 7 \text{ weeks} \\ \hline \end{array}$

**14.**  $\begin{array}{r} 7 \text{ hours } \quad \quad \quad 8 \text{ sec} \\ - 6 \text{ hours } 10 \text{ min} \\ \hline \end{array}$

**15.** 3 days = \_\_\_\_\_ hours

**17.** 3 years = \_\_\_\_\_ weeks

**16.** 18 minutes = \_\_\_\_\_ seconds

**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

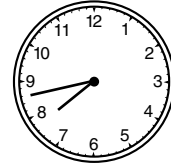
You can solve word problems involving elapsed time by adding or subtracting time. You may need to rename in some problems. Remember that there are 60 minutes in one hour.

**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?

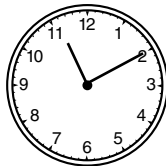
$$\begin{array}{r} 7:43 \\ - 11:25 \\ \hline \end{array} = \begin{array}{r} 19:43 \\ - 11:25 \\ \hline 8:18 \end{array}$$

Mr. Winkle slept 8 hours and 18 minutes.

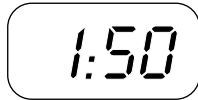


**Directions** Solve each word problem. Use the clock shown with each problem to help you.

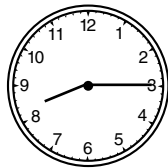
1. Tanya started to play tennis at 9:30. How long has she been playing?



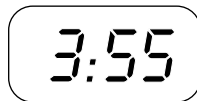
2. Emily left for the ocean at 7:45. She saw a clock when she arrived. How long was the trip?



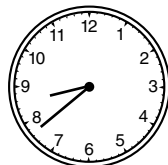
3. A video lasts 117 minutes. At what time will it be finished?



4. The roast is to cook for 2 hours and 15 minutes. At what time will it be finished cooking?



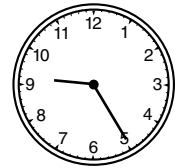
5. We can play for another half of an hour. At what time must we come in?



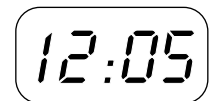
6. Carmine's favorite program comes on at 8:30. How long until it starts?



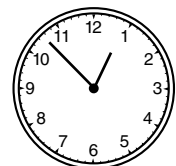
7. Niki arrived at the doctor's office at 8:45. She glanced at the clock when her name was called. How long did she wait?



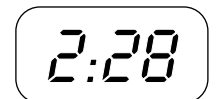
8. Jared started the meeting at 10:15. Afterward, he looked at the clock. How long was the meeting?



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.

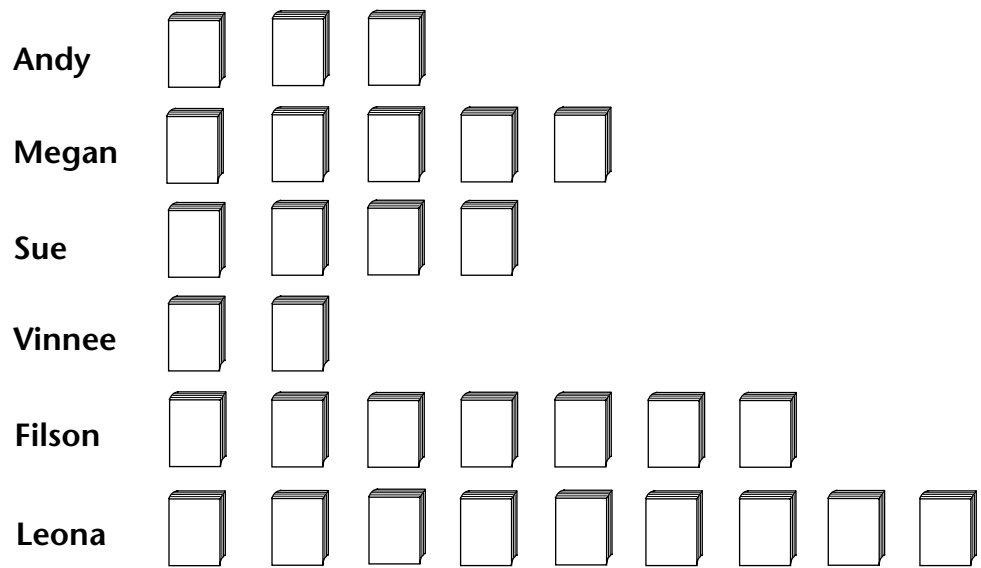
One book is equal to 4 books read.  
 How many books did Andy read?  
 3 whole books are pictured.  
 $3 \times 4 = 12$

Andy read 12 books.

### Summer Book Reading Club



= 4 books read



**Directions** Use the pictograph to answer the questions.

- How many books did Megan read for the summer? \_\_\_\_\_
- How many books did Sue read? \_\_\_\_\_
- How many books did Filson read? Did he read more than Andy? \_\_\_\_\_
- How many books did Vinnee read? \_\_\_\_\_
- How many books did Sue and Andy read? \_\_\_\_\_
- What was the total number of books read by the club? \_\_\_\_\_
- What is the title of this graph? \_\_\_\_\_
- How many books would Megan need to read to match Filson's total? \_\_\_\_\_
- How many books did Leona read? \_\_\_\_\_
- How many did both Leona and Megan read? \_\_\_\_\_

## Constructing Bar Graphs

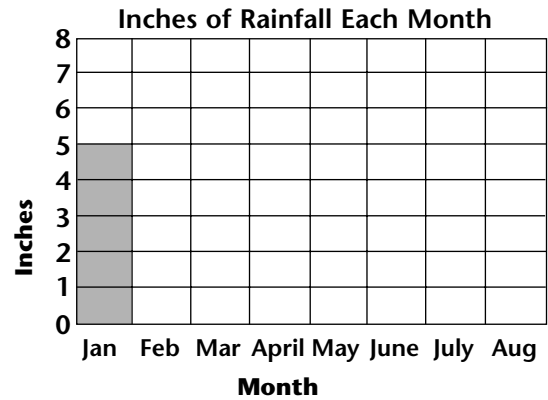
**EXAMPLE**

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

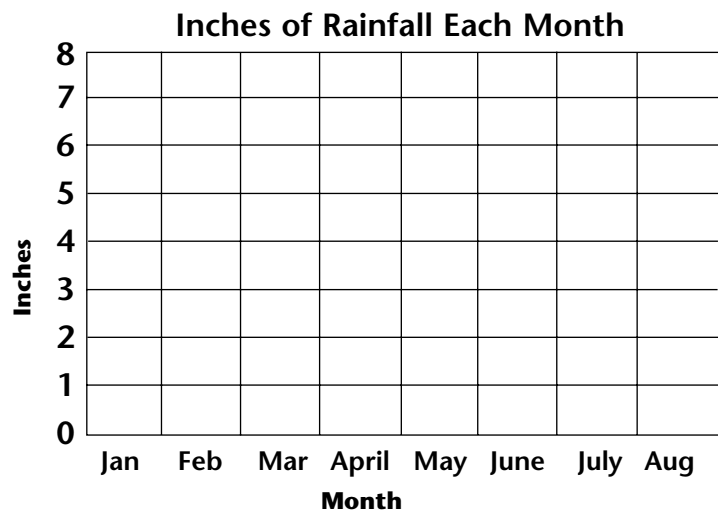
April = 2 inches

May = 6 inches

June = 5 inches

July = 8 inches

Aug = 5 inches



Jan = 6 inches

Feb = 3 inches

March = 7 inches

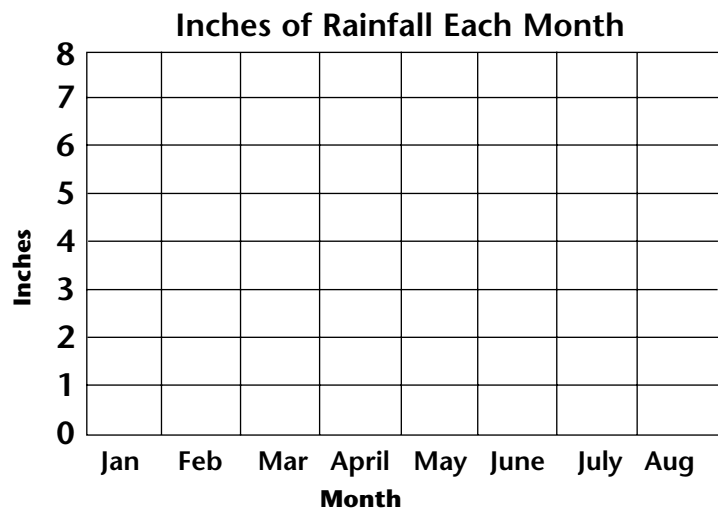
April = 1 inches

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.

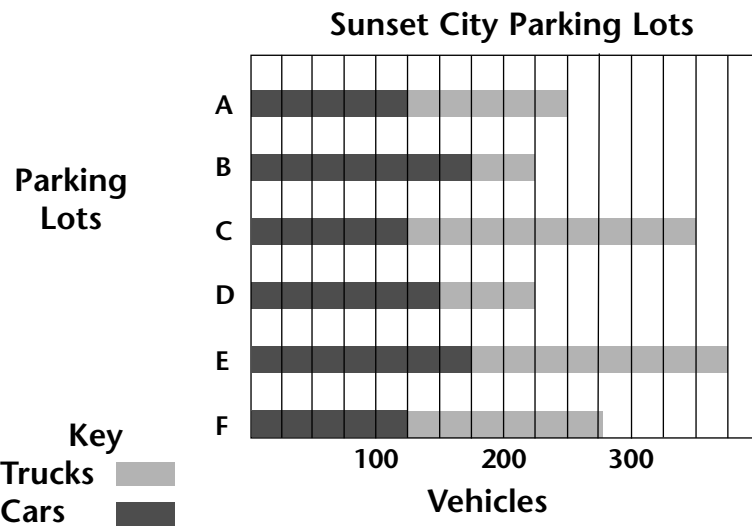
Read the key.

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.

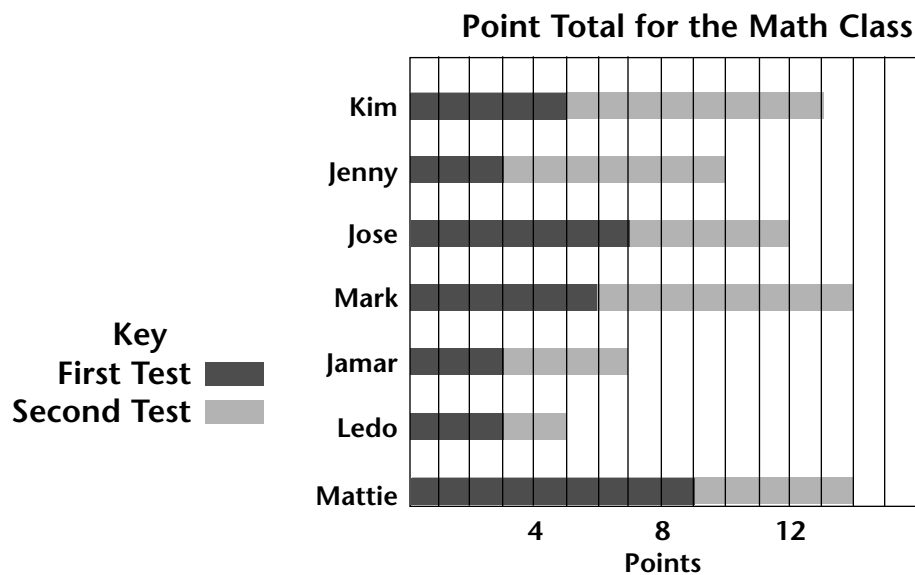
Read the key.

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.

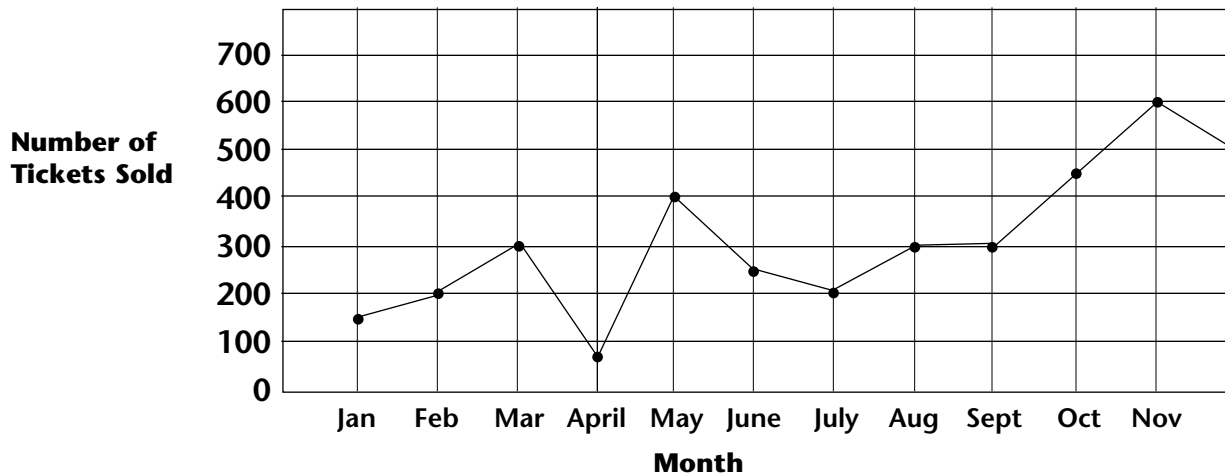
Use a straightedge to align the point for January with the vertical line.

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.

**School Raffle Ticket Sales**



- Were there more tickets sold in May than October? \_\_\_\_\_
- How many tickets were sold in May? \_\_\_\_\_  
October? \_\_\_\_\_
- How many tickets were sold in March? \_\_\_\_\_
- How many tickets were sold in the summer months of June and July? \_\_\_\_\_
- What month had the highest sales? \_\_\_\_\_
- What month had the lowest sales? \_\_\_\_\_
- How many more tickets were sold in May than July? \_\_\_\_\_
- How many tickets were sold in February? \_\_\_\_\_
- How many tickets were sold in June? \_\_\_\_\_
- 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.

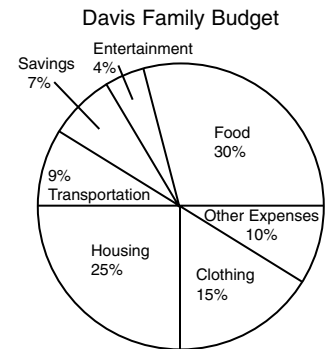
Multiply.  $\$24,000.00 \times 30\% =$   
 $\$24,000.00 \times 0.30 = \$7,200.00$

**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?

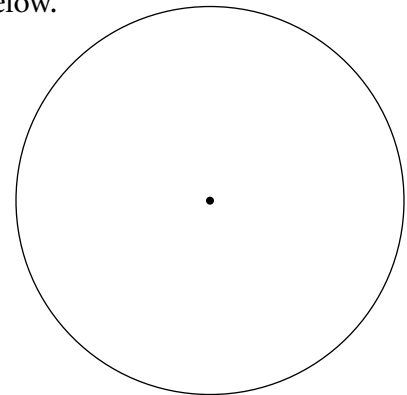
Food \_\_\_\_\_ Clothing \_\_\_\_\_ Transportation \_\_\_\_\_

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  $360^\circ$  in a circle. (Example:  $360^\circ \times 10\% = 36^\circ$ )
- 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.



<b>The Thomas Family Budget</b>	
Category	Percent Allowed
Food	25%
Housing	30%
Clothing	20%
Car	10%
Savings	5%
Other	10%



# Graphs That Mislead

**EXAMPLE**

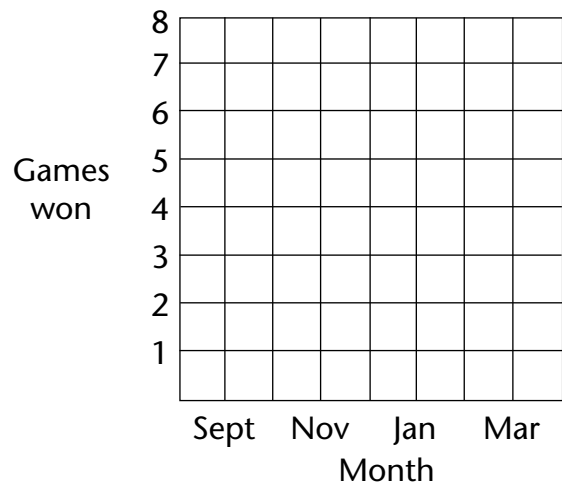
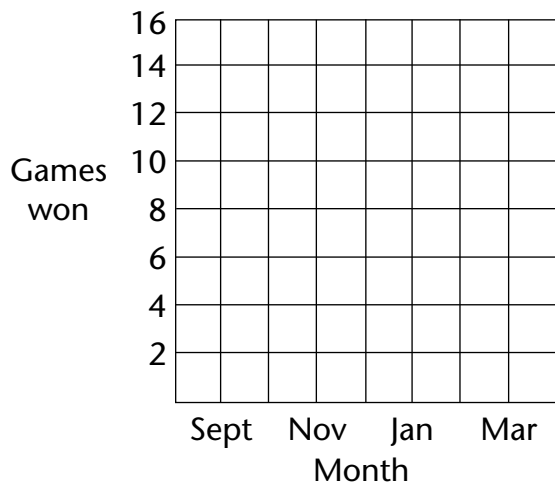
Draw a bar showing 3 games won in September on each graph.  
Find September on the graphs.  
Give a title for the graphs.  
Shade sections to show 3 games in each graph.



**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

- Construct 2 bar graphs for the data. Use the templates given below.
- Give a title for each graph.
- How do the graphs differ?
- Why does graph 2 look better than graph 1?
- Does one graph represent the data better than the other? Explain.



## Scale Models

**EXAMPLE**

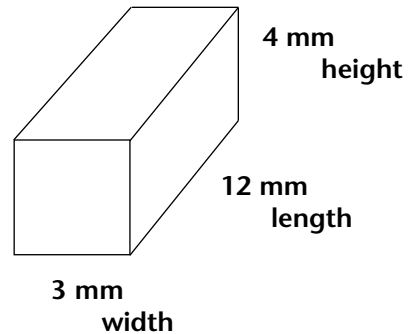
The building block shown below is a scale model of a much bigger block using 1:50 scale. How long is the actual block?

$$\frac{1}{50} = \frac{12}{n}$$

$$50 \times 12 = n$$

$$600 \text{ mm} = n \quad 600 \text{ mm is the length of the actual building block.}$$

**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?

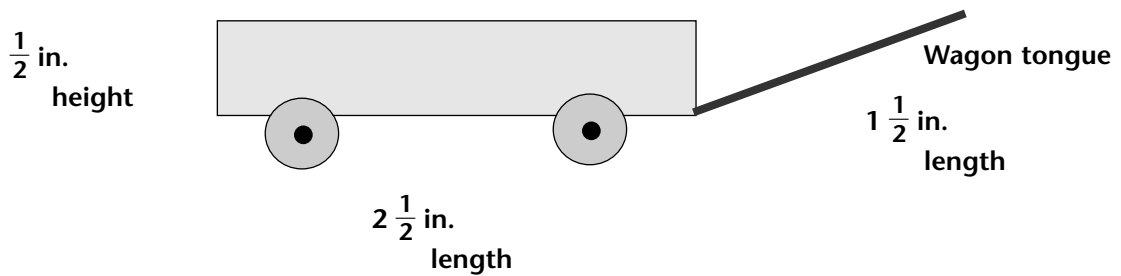
$$\frac{1}{50} = \frac{2\frac{1}{2}}{n}$$

$$2\frac{1}{2} \times 50 = n$$

$$\frac{5}{2} \times 50 = \frac{250}{2} = 125$$

125 inches =  $n$       The actual wagon is 125 inches long.

**Directions** Use the model to solve each problem.



- Solve for the actual height of the wagon if the scale is 1:50. \_\_\_\_\_
- Solve for the actual height of the wagon if the scale is 1:25. \_\_\_\_\_
- Solve for the actual length of the wagon with a scale of 1:100. \_\_\_\_\_
- How long is the wagon tongue if the scale is 1:50? \_\_\_\_\_
- 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.

$$\frac{1}{8} = \frac{6}{n}$$

$$8 \times 6 = n$$

$$48 \text{ feet} = n \quad \text{Actual length is 48 feet.}$$

Find the width.

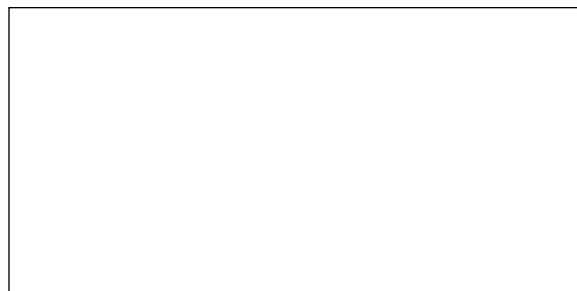
Set up a proportion.

$$\frac{1}{8} = \frac{3}{n}$$

$$8 \times 3 = n$$

$$24 \text{ feet} = n \quad \text{Actual width is 24 feet.}$$

**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.

$$3\frac{1}{2} \times 500 = \text{actual distance}$$

$$\frac{7}{2} \times 500 = \text{actual distance}$$

$$\frac{3,500}{2} = \text{actual distance}$$

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 = \_\_\_\_\_

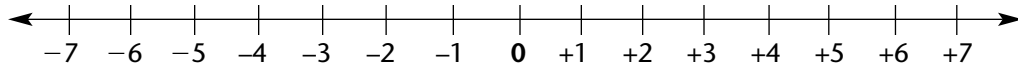
10. scale of 1 inch = 200 miles  
measured distance of  $1\frac{1}{2}$  inches  
actual distance = \_\_\_\_\_



# 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.**  $-101$       \_\_\_\_\_

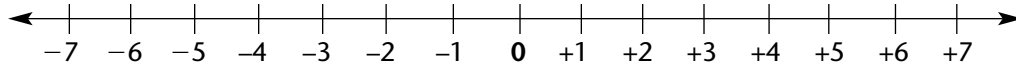
**31.**  $-1$       \_\_\_\_\_      **34.**  $+1$       \_\_\_\_\_      **37.**  $+22$       \_\_\_\_\_      **40.**  $+46$       \_\_\_\_\_

## 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.

- |                             |                                |                                |
|-----------------------------|--------------------------------|--------------------------------|
| <b>1.</b> $+3 + (-7)$ _____ | <b>8.</b> $-9 + (+1)$ _____    | <b>15.</b> $-1 + 0$ _____      |
| <b>2.</b> $-3 + (+2)$ _____ | <b>9.</b> $-3 + (+9)$ _____    | <b>16.</b> $-13 + (-12)$ _____ |
| <b>3.</b> $-3 + (+8)$ _____ | <b>10.</b> $+2 + (+4)$ _____   | <b>17.</b> $+11 + (-21)$ _____ |
| <b>4.</b> $-9 + (-1)$ _____ | <b>11.</b> $+8 + (-1)$ _____   | <b>18.</b> $-19 + (+10)$ _____ |
| <b>5.</b> $-3 + (-1)$ _____ | <b>12.</b> $+2 + (-2)$ _____   | <b>19.</b> $+12 + (-16)$ _____ |
| <b>6.</b> $-7 + (+1)$ _____ | <b>13.</b> $-11 + (-12)$ _____ | <b>20.</b> $-14 + (+1)$ _____  |
| <b>7.</b> $-1 + (-1)$ _____ | <b>14.</b> $-10 + (-10)$ _____ |                                |

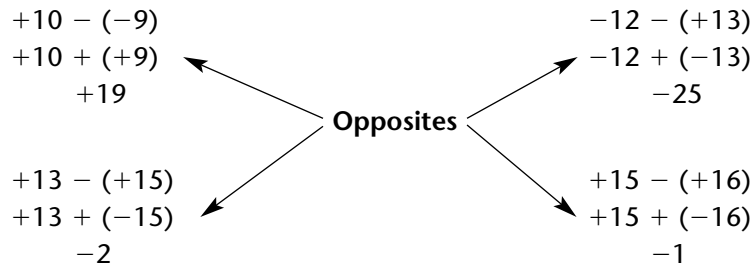
**Directions** Give the absolute value for each number.

- |                          |                           |                           |
|--------------------------|---------------------------|---------------------------|
| <b>21.</b> $ -3 $ _____  | <b>28.</b> $ -99 $ _____  | <b>35.</b> $ +102 $ _____ |
| <b>22.</b> $ +12 $ _____ | <b>29.</b> $ +22 $ _____  | <b>36.</b> $ +38 $ _____  |
| <b>23.</b> $ -1 $ _____  | <b>30.</b> $ -202 $ _____ | <b>37.</b> $ +51 $ _____  |
| <b>24.</b> $ -11 $ _____ | <b>31.</b> $ -33 $ _____  | <b>38.</b> $ -18 $ _____  |
| <b>25.</b> $ -6 $ _____  | <b>32.</b> $ +17 $ _____  | <b>39.</b> $ -111 $ _____ |
| <b>26.</b> $ -77 $ _____ | <b>33.</b> $ +21 $ _____  | <b>40.</b> $ -90 $ _____  |
| <b>27.</b> $ +8 $ _____  | <b>34.</b> $ -28 $ _____  |                           |

## 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.

- |   |  |
|---|--|
| <p><b>1.</b> <math>+1 - (-12)</math> _____</p> <p><b>2.</b> <math>+22 - (-12)</math> _____</p> <p><b>3.</b> <math>+10 - (-12)</math> _____</p> <p><b>4.</b> <math>+20 - (-12)</math> _____</p> <p><b>5.</b> <math>-9 - (+11)</math> _____</p> <p><b>6.</b> <math>-31 - (+20)</math> _____</p> <p><b>7.</b> <math>+21 - (-20)</math> _____</p> <p><b>8.</b> <math>+3 - (+3)</math> _____</p> <p><b>9.</b> <math>-29 - (+23)</math> _____</p> <p><b>10.</b> <math>-21 - (+21)</math> _____</p> <p><b>11.</b> <math>+34 - (-23)</math> _____</p> <p><b>12.</b> <math>+56 - (-40)</math> _____</p> <p><b>13.</b> <math>-31 - (-13)</math> _____</p> <p><b>14.</b> <math>-90 - (+41)</math> _____</p> <p><b>15.</b> <math>+26 - (-50)</math> _____</p> | <p><b>16.</b> <math>-11 - (-51)</math> _____</p> <p><b>17.</b> <math>-14 - (-33)</math> _____</p> <p><b>18.</b> <math>-10 - (-22)</math> _____</p> <p><b>19.</b> <math>-28 - (+1)</math> _____</p> <p><b>20.</b> <math>-10 - (-40)</math> _____</p> <p><b>21.</b> <math>+20 - (-50)</math> _____</p> <p><b>22.</b> <math>-18 - (+7)</math> _____</p> <p><b>23.</b> <math>-21 - (-22)</math> _____</p> <p><b>24.</b> <math>-20 - (+20)</math> _____</p> <p><b>25.</b> <math>+2 - (-1) - (-2) - (+11)</math> _____</p> <p><b>26.</b> <math>+1 - (-3) - (+3) - (-10)</math> _____</p> <p><b>27.</b> <math>-10 - (-11) - (+12) - (-12)</math> _____</p> <p><b>28.</b> <math>-1 - (+1) - (+2) - (-3)</math> _____</p> <p><b>29.</b> <math>+12 - (-10) - (-11) - (+20)</math> _____</p> <p><b>30.</b> <math>+11 - (-10) - (-1) - (+2)</math> _____</p> |
|---|--|



## Word Problems

**EXAMPLE**

Subtract by adding the opposite.

$$-19 - (+10) + (-15)$$

$$-19 + (-10) + (-15) = -44$$

**Directions** Find these sums and differences.

- |                                 |       |                              |       |
|---------------------------------|-------|------------------------------|-------|
| 1. $-2 - (+4) + (-7) - (+8)$    | _____ | 6. $+15 - (+16) + (+10)$     | _____ |
| 2. $-1 + (+33) + (-10) - (-10)$ | _____ | 7. $+11 - (-11) + (+10)$     | _____ |
| 3. $-10 + (-12) + (+19) - (-2)$ | _____ | 8. $-19 - (-19) + (+8)$      | _____ |
| 4. $+3 - (+4) - (+5) - (-7)$    | _____ | 9. $+2 - (-1) - (+7) - (+8)$ | _____ |
| 5. $-4 - (-7) + (+10) + (-8)$   | _____ | 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.

$$-3(-4) = +12 \quad +2(+4) = +8$$

The product of two numbers with unlike signs will be negative.

$$-3(+7) = -21 \quad +4(-10) = -40$$

**Directions** Write the factor to make a correct sentence.

**1.**  $-4(\quad) = -16$

**6.**  $(+8) = -64$

**11.**  $+9(\quad) = -27$

**2.**  $+5(\quad) = +20$

**7.**  $+19(\quad) = -38$

**12.**  $(+4) = -48$

**3.**  $(-6) = -18$

**8.**  $(-22) = +66$

**13.**  $-2(\quad)(-5) = -30$

**4.**  $-7(\quad) = -14$

**9.**  $-1(\quad) = -1$

**14.**  $(-3)(+5) = +45$

**5.**  $-6(\quad) = +24$

**10.**  $+12(\quad) = -36$

**15.**  $+5(+2)(\quad) = -20$

**Directions** Solve for the product.

**16.**  $-5(-6) = \underline{\hspace{2cm}}$

**24.**  $+9(-3)(-1) = \underline{\hspace{2cm}}$

**17.**  $-4(+5) = \underline{\hspace{2cm}}$

**25.**  $+5(-5)(-5) = \underline{\hspace{2cm}}$

**18.**  $+7(-5) = \underline{\hspace{2cm}}$

**26.**  $-1(-1)(-1)(-1) = \underline{\hspace{2cm}}$

**19.**  $-23(+2) = \underline{\hspace{2cm}}$

**27.**  $+2(-8)(-2)(-1) = \underline{\hspace{2cm}}$

**20.**  $-2(-3)(-4) = \underline{\hspace{2cm}}$

**28.**  $-4(+8)(-2) = \underline{\hspace{2cm}}$

**21.**  $+3(-6)(-1) = \underline{\hspace{2cm}}$

**29.**  $-3(+3)(-1)(-1) = \underline{\hspace{2cm}}$

**22.**  $-9(+2)(-2) = \underline{\hspace{2cm}}$

**30.**  $-7(+3)(+2) = \underline{\hspace{2cm}}$

**23.**  $-7(-7)(+2) = \underline{\hspace{2cm}}$

## Properties of Addition and Multiplication

### EXAMPLES

#### Commutative Property of Addition and Multiplication

$$7 + 8 = 8 + 7$$

$$15 = 15 \quad \text{Both sums equal 15.}$$

$$-3 \times (-4) = -4 \times (-3)$$

$$+12 = +12 \quad \text{Both products equal +12.}$$

#### 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.  $-9 \times (+8) =$   
\_\_\_\_\_

11.  $23 + (45 + 20) =$   
\_\_\_\_\_

14.  $-15(-10) =$   
\_\_\_\_\_

9.  $-6(-8) =$   
\_\_\_\_\_

12.  $(7 + 19) + 12 =$   
\_\_\_\_\_

15.  $-3(-8) =$   
\_\_\_\_\_

10.  $4 \times (12 - 7) =$   
\_\_\_\_\_

13.  $(12 + 4) + 3 =$   
\_\_\_\_\_

## Dividing Positive and Negative Integers

**EXAMPLES**

The quotient of two numbers with like signs will be positive.

$$-12 \div (-4) = +3 \text{ and } +20 \div (+5) = +4$$

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.  $\frac{-80}{+4} =$  \_\_\_\_\_

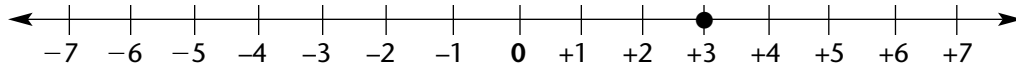
29.  $\frac{+110}{-11} =$  \_\_\_\_\_

30.  $\frac{+24}{+8} =$  \_\_\_\_\_

## Variables and the Number Line

**EXAMPLE**

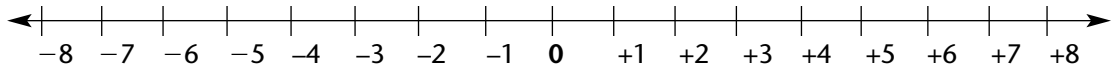
Find the number on the number line. Draw a dot there.



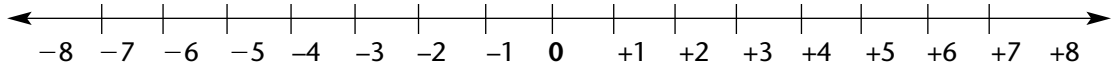
$x = 3$

**Directions** Graph these values of  $x$  on the number lines.

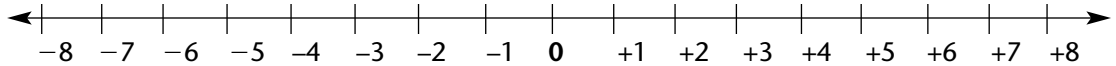
1.  $x = 7$



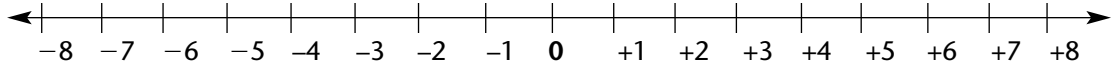
2.  $x = -4$



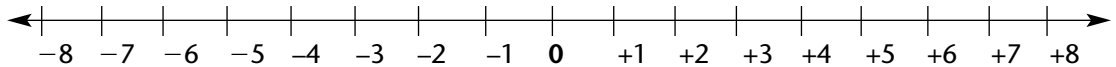
3.  $x = -2$



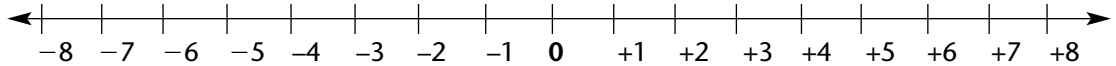
4.  $x = +5$



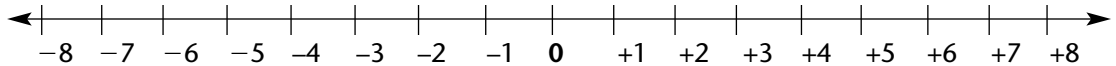
5.  $x = -6$



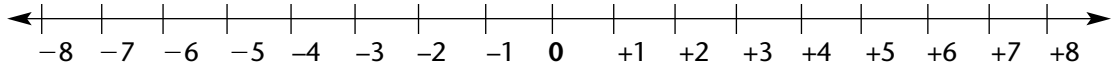
6.  $x = -1$



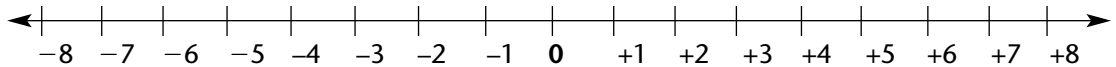
7.  $x = -7$



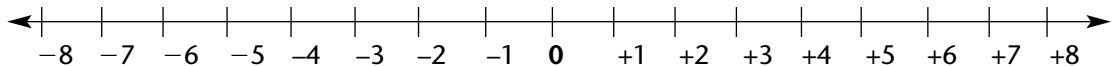
8.  $x = -8$



9.  $x = 0$



10.  $x = 6$



# Graphing Coordinates

**EXAMPLE**

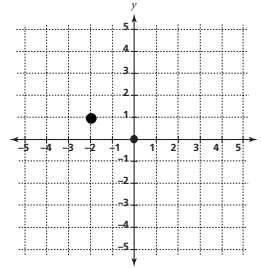
Number the  $x$  and  $y$  axes and graph the ordered pairs.

Plot  $(-2, 1)$ .

Find  $-2$  on  $x$  on the graph.

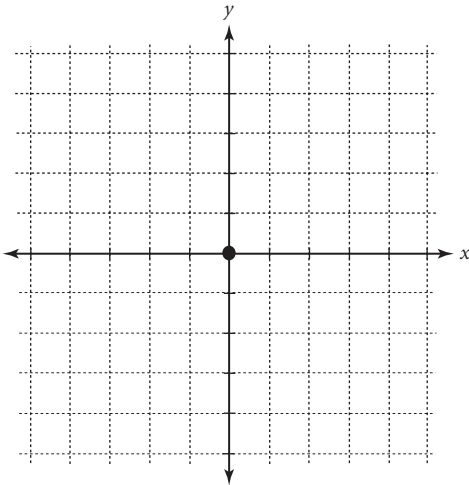
Find  $1$  on  $y$  on the graph.

Plot the point where they meet.

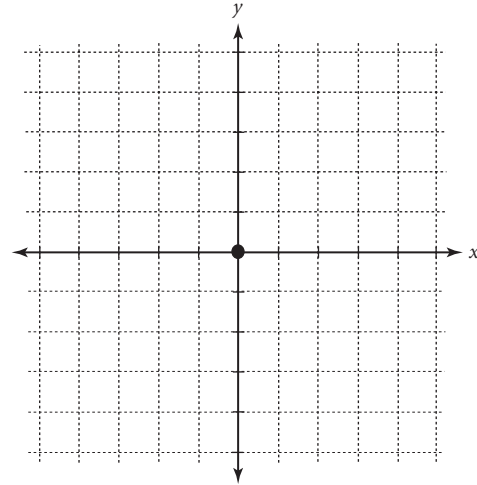


**Directions** Number the  $x$  and  $y$  axes and graph the ordered pairs.

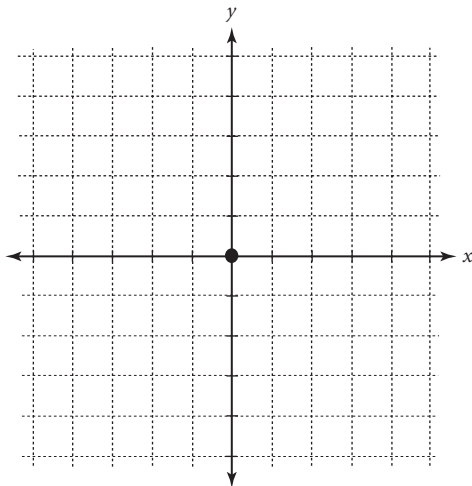
1.  $(-3, 4)$   $(-5, -5)$   $(1, 4)$   $(0, -3)$   $(4, 0)$



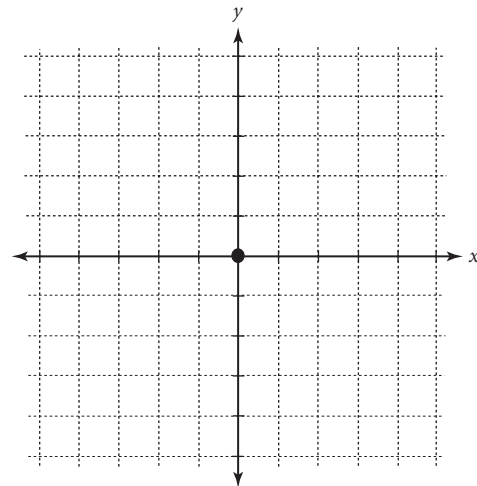
3.  $(2, -5)$   $(-1, -1)$   $(-2, 4)$   $(5, -3)$   $(-4, -2)$



2.  $(2, 1)$   $(3, -1)$   $(-2, 5)$   $(-4, 4)$   $(-3, -4)$



4.  $(0, -1)$   $(0, 4)$   $(-4, 0)$   $(-1, 3)$   $(-4, 1)$



## Solving Equations by Adding and Subtracting

**EXAMPLE**Solve the equation.  $x - 19 = +2$ 

$$x - 19 = +2$$

$$\underline{+19 = +19}$$

$$x + 0 = +21$$

$$x = +21$$

**Directions** Solve for the variable. Show steps.

**1.**  $x - 2 = 10$

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**7.**  $x + 2 = -11$

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**13.**  $y + 1 = -12$

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**2.**  $x + 2 = 12$

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**8.**  $-3 + x = -9$

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**14.**  $8 = x - 11$

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**3.**  $x - 10 = 12$

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**9.**  $4 + x = -13$

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**15.**  $h - 13 = -23$

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**4.**  $x - 10 = -19$

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**10.**  $y - 12 = -3$

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**5.**  $x + 8 = -2$

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**11.**  $-9 + y = -23$

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**6.**  $x - 10 = 20$

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**12.**  $11 = x - 10$

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## 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.  $4x = 20$

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9.  $\frac{x}{5} = 8$

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17.  $-2x = -46$

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2.  $5x = 25$

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10.  $\frac{y}{3} = 9$

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18.  $\frac{x}{4} = 23$

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3.  $7x = 56$

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11.  $\frac{k}{8} = 12$

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19.  $\frac{y}{-9} = 42$

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4.  $9x = 81$

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12.  $\frac{y}{10} = 14$

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20.  $-3k = 30$

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5.  $8y = 72$

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13.  $-7x = 42$

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6.  $8f = 96$

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14.  $\frac{k}{9} = 17$

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7.  $12x = 144$

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15.  $\frac{x}{-8} = 20$

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8.  $6x = 66$

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16.  $-7x = 35$

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## Two-Step Equations

**EXAMPLE**

Solve for the variable. Subtract 3 from both sides. Then divide each side by 2.

$$\begin{array}{r} 2x + 3 = 13 \\ -3 = -3 \\ \hline 2x = 10 \\ \frac{2x}{2} = \frac{10}{2} \\ x = 5 \end{array}$$

**Directions** Solve for the variables. Leave fractional answers as improper fractions. Show your work.

1.  $3x + 4 = 14$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ x = \underline{\hspace{2cm}} \end{array}$$

2.  $3y - 2 = 19$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ y = \underline{\hspace{2cm}} \end{array}$$

3.  $3y - 8 = 16$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ y = \underline{\hspace{2cm}} \end{array}$$

4.  $2y - 5 = -37$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ y = \underline{\hspace{2cm}} \end{array}$$

5.  $6x + 1 = 27$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ x = \underline{\hspace{2cm}} \end{array}$$

6.  $8k - 2 = 70$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ k = \underline{\hspace{2cm}} \end{array}$$

7.  $6a - 1 = 22$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ a = \underline{\hspace{2cm}} \end{array}$$

8.  $9a + 1 = 82$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ a = \underline{\hspace{2cm}} \end{array}$$

9.  $7z - 2 = 22$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ z = \underline{\hspace{2cm}} \end{array}$$

10.  $3a - 2 = 42$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ a = \underline{\hspace{2cm}} \end{array}$$

11.  $4a + 1 = 35$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ a = \underline{\hspace{2cm}} \end{array}$$

12.  $-2z - 2 = 33$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ z = \underline{\hspace{2cm}} \end{array}$$

13.  $4x - 5 = 32$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ x = \underline{\hspace{2cm}} \end{array}$$

14.  $7w + 1 = 29$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ w = \underline{\hspace{2cm}} \end{array}$$

15.  $-5k - 7 = 76$

$$\begin{array}{l} \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \\ k = \underline{\hspace{2cm}} \end{array}$$

## Combining Like Terms

**EXAMPLE**Combine like terms. Add the two terms.  $-2a - 4a$ 

$$\begin{array}{r} -2a \\ -4a \\ \hline \end{array}$$

$$\begin{array}{r} -4a \\ \hline \end{array}$$

$$-6a \quad \text{so } -2a - 4a = -6a$$

**Directions** Combine like terms.

1.  $-7a - 6a$

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8.  $+7x + 2x - 10x$

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15.  $23c - 8c + c$

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22.  $+7 + 12a - 7a$

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2.  $+4a - 5a$

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9.  $-10y + 31y - y$

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16.  $9 - 17c + 5c$

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23.  $3 - x - x - 2x$

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3.  $-2c - 3c - 4c$

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10.  $-30f - 11f + 1$

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17.  $+a + a + 8$

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24.  $13x - 18x + 1$

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4.  $-4v - 3v$

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11.  $-17y + 20y - 2$

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18.  $-18y + 17y + 1$

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25.  $1 - 3f + 2f + 3$

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5.  $7x + 3x - x$

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12.  $4 - 8a - 3a$

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19.  $-2a - 3a + 5a$

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6.  $-x - 4x + 9x$

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13.  $-x - x + 4$

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20.  $12 + 12a - 24$

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7.  $-2x + 8x - x$

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14.  $+4c - 7c - c$

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21.  $-22 + 20y - y$

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