⑥

	Distance	rate	time
walking	3	x	$3/x$
jogging	3	$3x$	$3/3x$

$$\text{total time} = \begin{pmatrix} \text{time spent} \\ \text{walking} \end{pmatrix} + \begin{pmatrix} \text{time spent} \\ \text{jogging} \end{pmatrix}$$

$$4 = \frac{3}{x} + \frac{3}{3x}$$

$$4 = \frac{9}{3x} + \frac{3}{3x}$$

$$\frac{4}{1} = \frac{12}{3x}$$

$$12x = 12$$

$$\frac{12}{12}x = \frac{12}{12}$$

$$\boxed{x = 1 \text{ mph}}$$
$$\boxed{3x = 3 \text{ mph}}$$

---

⑦

	Distance	rate	time
upstream	6	$x-3$	$6/(x-3)$
downstream	12	$x+3$	$12/(x+3)$

Let x = speed of boat in still water

time is the same

$$\frac{6}{x-3} = \frac{12}{x+3}$$

$$6(x+3) = 12(x-3)$$

$$6x+18 = 12x-36$$

$$6x = 54$$

$$\boxed{x = 9 \text{ mph}}$$

---

⑧ p549 textbook

Let x = the time it takes for both men to clear the driveway

	Fractional Part of the job completed in 1 min	Time working together	Fractional Part the job completed in x minutes
Student	$\frac{1}{16}$	x	$x/16$
Student's brother	$\frac{1}{14}$	x	$x/14$

$$\begin{pmatrix} \text{fractional part of} \\ \text{the job done by} \\ \text{the student} \end{pmatrix} + \begin{pmatrix} \text{fractional part of} \\ \text{the job completed} \\ \text{by the brother} \end{pmatrix} = \begin{pmatrix} \text{one whole} \\ \text{job} \end{pmatrix}$$

$$\frac{x}{16} + \frac{x}{14} = 1$$

$LCD = 2^4 \cdot 7 = 112$

multiply by LCD

$$\frac{112}{1} \cdot \frac{x}{16} + \frac{112}{1} \cdot \frac{x}{14} = 112$$

$$7x + 8x = 112$$

$$15x = 112$$

$$\frac{15x}{15} = \frac{112}{15}$$

$$\boxed{x \doteq 7.5 \text{ minutes}}$$

④

	fractional part of the job completed in 1 hour	time working together	Fractional Part of the job completed in x hours
first pipe	$\frac{1}{5}$	x	$\frac{x}{5}$
2nd pipe	$\frac{1}{7}$	x	$\frac{x}{7}$

$$\left(\begin{array}{c}\text{fractional part}\\\text{completed by}\\\text{the 1st pipe}\end{array}\right) + \left(\begin{array}{c}\text{fractional part}\\\text{completed by}\\\text{the 2nd pipe}\end{array}\right) = \left(\begin{array}{c}\text{one whole}\\\text{job}\end{array}\right)$$

$\frac{x}{5} + \frac{x}{7} = 1 \; ; \; LCD = 35$ 　　 $7x + 5x = 35$

$\frac{35}{7} \cdot \frac{x}{5} + \frac{35}{1} \cdot \frac{x}{7} = 35$ 　　 $12x = 35$

$x = 35/12 \doteq \boxed{2.9 \text{ hours}}$

---

⑩ p 551

$\frac{56000}{800} = \frac{102000}{x}$

$70 = \frac{102000}{x}$

$70x = \frac{102000}{x} \cdot x$

$70x = 102000$

$x = \frac{102000}{70} \doteq$

$x \doteq \$1,457.14$

⑪ $\frac{10}{67} = \frac{23}{x}$

$10x = (67)(23)$

$10x = 1541$

$\frac{10x}{10} = \frac{1541}{10}$

$\boxed{x = 154.1 \text{ inches height}}$

1. Fill in the blanks in the sentence below so that the resulting statement is true.

The formula $t = \dfrac{d}{r}$ states that time traveled is ⬚ rate of travel / distance traveled ⬚ divided by

⬚ distance traveled. / rate of travel. ⬚

2. Fill in the blank in the sentence below so that the resulting statement is true.

If a man can complete a job in 4 hours, the fractional part of the job that can be completed in x hours is represented by

$4x.$
$x + 4.$
$\dfrac{4}{x}.$
$\dfrac{x}{4}.$
$x - 4.$

3. Fill in the blank in the sentence below so that the resulting statement is true.

Triangles that have the same shape, but not necessarily the same size, are called ⬚ identical / similar ⬚

triangles.

Student: Tim Busken
Date: 6/24/14
Time: 11:41 AM

Instructor: Tim Busken
Course: busken64
Book: Blitzer: Introductory &
Intermediate Algebra for College
Students, 4e

Assignment: Math 64 - Homework 7.7

4. How bad is the heavy traffic? You can walk 10 miles in the same time that it takes to travel 20 miles by car. If the car's rate is 3 miles per hour faster than your walking rate, find the average rate of each.

	Distance	Rate	Time $= \dfrac{\text{Distance}}{\text{Rate}}$
Walking	10	x	$\dfrac{10}{x}$
Car in Heavy Traffic	20	x + 3	$\dfrac{20}{x+3}$

Your walking rate is ☐ miles per hour.

The car's rate is ☐ miles per hour.

5. A truck can travel 60 miles in the same time that it takes a car to travel 90 miles. If the truck's rate is 15 miles per hour slower than the car's, find the average rate for each.

The rate of the car is 45 miles per hour.

The rate of the truck is ☐ miles per hour.

6. As part of an exercise regimen, you walk 3 miles on an indoor track. Then you jog at three times your walking speed for another 3 miles. If the total time spent walking and jogging is 4 hours, find the walking and jogging rates.

The walking rate is 1 miles per hour.

The jogging rate is ☐ miles per hour.

7. The speed of a stream is 3 mph. A boat travels 6 miles upstream in the same time it takes to travel 12 miles downstream. What is the speed of the boat in still water?

The speed is 9 mph.

8. A student must leave for campus in 10 minutes or he will be late for class. Unfortunately, he is snowed in. He can shovel the driveway in 16 minutes, and his brother claims to be able to do it in 14 minutes. If they shovel together, how long will it take to clear the driveway? Will this give enough time for the student to get to the campus?

It will take about 7.5 minutes to clear the driveway together.
(Type an integer or decimal rounded to one decimal place as needed.)

Does this give enough time for the student to get to the campus?

  ○ A. This does not give enough time for the student to get to the campus.

  ○ B. This gives enough time for the student to get to the campus.

9. A pool can be filled by one pipe in 5 hours and by a second pipe in 7 hours. How long will it take using both pipes to fill the pool?

It will take about 2.9 hours to fill the pool using both pipes.
(Type an integer or decimal rounded to the nearest tenth.)

10. The tax on a property with an assessed value of $56,000 is $800. Using a proportion, find the tax on a property with an assessed value of $102,000.
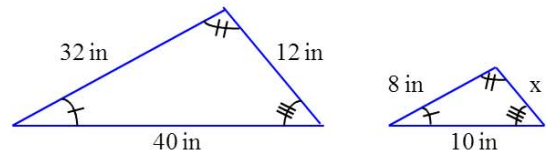
$ 14571.43
(Round to two decimal places.)

11. Height is proportional to foot length. A person whose foot length is 10 inches is 67 inches tall. A human-like creature has a foot length of 23 inches. Use a proportion to find the height of the creature.

The creature is ☐ inches tall.

12. Use similar triangles and the fact that corresponding sides are proportional to find the length of the side marked with an x.
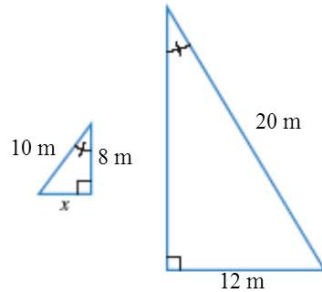

The missing length, x, is ☐ inches.
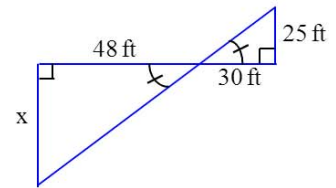
13. Use similar triangles and the fact that corresponding sides are proportional to find the length of the side marked with an x.
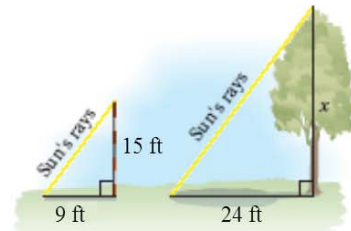
$x = \boxed{}$ m

20 m

10 m 8 m

x

12 m

14. Use similar triangles and the fact that corresponding sides are proportional to find the length of the side marked with an x.

48 ft   25 ft

30 ft

x

The missing length, x, is $\boxed{}$ feet.

15. A tree casts a shadow 24 feet long. At the same time, a vertical rod 15 feet high casts a shadow 9 feet long. How tall is the tree?

Sun's rays   Sun's rays

15 ft   x

9 ft   24 ft

The tree is $\boxed{}$ feet tall.

Mini Lecture 8.1
Introduction to Functions

Learning Objectives:
1. Find the domain and range of a relation.
2. Determine whether a relation is a function.
3. Evaluate a function.

Examples:
1. Find the domain and range of the relation.
   a. {(1, 5), (2, 10), (3, 15), (4, 20), (5, 25)}   b. {(1, -1), (0, 0), (-5, 5)}

2. Determine whether each relation is a function.
   a. $\{(5,6),(5,7),(5,8),(5,9),(5,10)\}$ b. {(5, 6), (6, 7), (7, 8), (8, 9), (9, 10)}

3. Find the indicated function value.
   a. $f(3)$ for $f(x) = 3x - 2$ b. $g(-2)$ for $g(x) = 2x^2 - x + 4$
   c. $h(-1)$ for $h(t) = t^2 - 3t + 2$ d. $f(a+h)$ for $f(x) = 2x + 3$

4. Function g is defined by the table

x	$g(x)$
0	2
1	4
2	6
3	8
4	10

   Find the indicated function value.
   a. $g(2)$ b. $g(4)$

Teaching Notes:
- A **relation** is any set of ordered pairs.
- The set of all first terms "x-values" of the ordered pairs is called the **domain**.
- The set of all second terms "y-values" of the ordered pairs is called the **range**.
- A **function** is a relation in which each member of the domain corresponds to exactly one member of the range.
- A function is a relation in which no two ordered pairs have the same first component and different second components.
- The variable "x" is called the **independent variable** because it can be assigned any value from the domain.
- The variable "y" is called the **dependent variable** because its value depends on "x".
- The notation $f(x)$, read "f of x" represents the value of the function at the number "x".

Answers: 1. domain {1, 0, -5} range {-1, 0, 5}   2. a. not a function   b. function
3. a. 7   b. 14   c. 6   d. $2a + 2h + 3$ n   4. a. 6   b. 10

Mini Lecture 8.2
## Graphs of Functions

Learning Objectives:
1. Graph functions by plotting points.
2. Use the vertical line test to identify functions.
3. Obtain information about a function from its graph.
4. Identify the domain and range of a function from its graph.

Examples:
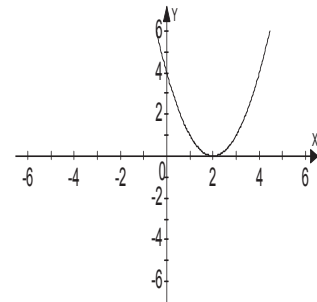
State the domain of each function.

1. Graph the function $f(x) = 3x$ and $g(x) = 3x + 1$ in the same rectangular coordinate system. Graph integers for x starting with -2 and ending with 2. How is the graph of g related to the graph of f?

2. Use the vertical line test to identify graphs in which y is a function of x.

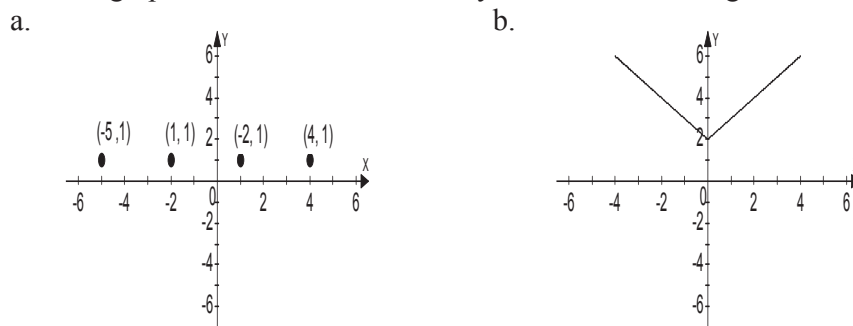   a.   b.   c.
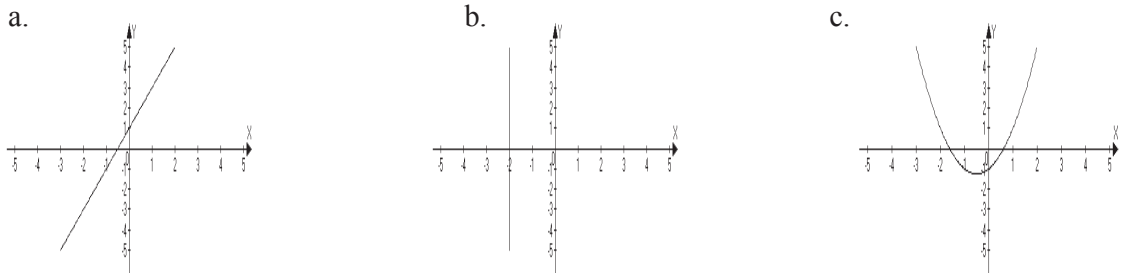
3. Use the graph of f to find the indicated function value.
   a. $f(2)$ b. $f(0)$ c. $f(1)$

4. Use the graph each function to identify its domain and range.

   a.   b.

Teaching notes:

- The <u>graph of a function</u> is the graph of the ordered pairs.
- If a vertical line intersects a graph in more than one point, the graph does not define y as a function of x.

<u>Answers</u>**:**

1. The graph of g is the graph of f shifted up 1 unit. 2. a. yes b. no c. yes 3. a. 0 b. 4 c. 1
4. a. Domain: $\{-5, 1, 1.4\}$ Range: $\{1\}$ b. Domain: $[0, \infty)$ Range: $[2, \infty)$