Get out your book and turn to page 266 and Warm Up on #1-11.

Classwork - New Unit (Functions)

Quick Check

Coordinate Graphing Name the ordered pair for each point.

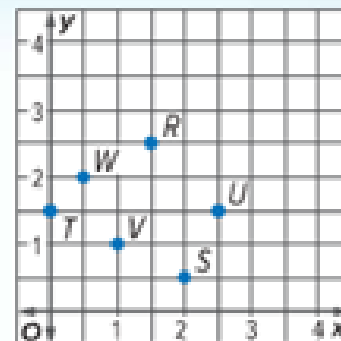1. R $\left(1\frac{1}{2}, 2\frac{1}{2}\right)$

2. S $\left(2, \frac{1}{2}\right)$

3. T $\left(0, 1\frac{1}{2}\right)$

4. U $(2.5, 1.5)$

5. V $(1, 1)$

6. W $(0.5, 2)$

Evaluate Expressions Evaluate each expression if $x = -6$.

7. $3x$ -18

$3(-6)$

8. $4x + 9$ -15

$4(-6) + 9$

9. $\frac{x}{2}$ -3

$\frac{-6}{2}$

10. $\frac{3x}{9}$ -2

$\frac{3(-6)}{9}$

11. The weekly profit of a certain company is $48x - 875$, where x represents the number of units sold. Find the weekly profit if the company sells 37 units. 901

Space To achieve orbit, the space shuttle must travel at a rate of about 5 miles per second. The table shows the total distance d that the craft covers in certain periods of time t.

IV *DV*

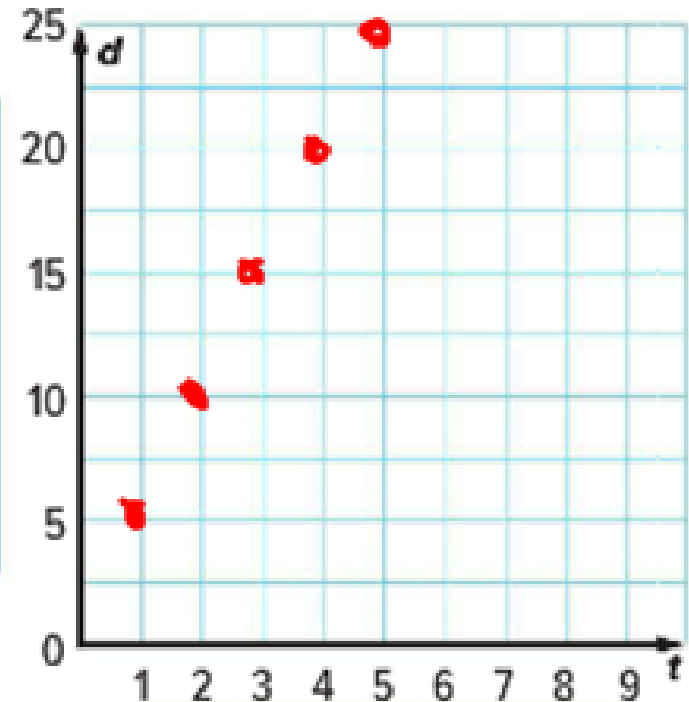| Time t (seconds)	Distance d (miles)
1	5
2	10
3	15
4	20
5	25

+1 +1 +1 *+5 +5 +5*

1. Write an algebraic expression for the distance in miles for any number of seconds t. **5t**

2. Describe the relationship in words.
   5 multiplied by the # of seconds

3. Graph the ordered pairs. Describe the shape of the graph.

Output d *Distance*

Time *IV Input*

Tables, Graphs, and Equations

Recall that an equation is a mathematical sentence stating that two quantities are equal. A **linear equation** is an equation with a graph that is a straight line. Some equations contain more than one variable.

Examples

The table shows the number of liters in quarts of liquid.

1. Write an equation to find the number of liters in any number of quarts. Describe the relationship in words.

   The rate of change is the rate that describes how one quantity changes in relation to another quantity. The rate of change of quarts to liters is $\frac{1.9 - 0.95}{2 - 1} = \frac{0.95}{1}$ or 0.95 liter in every quart.

Quarts, q	Liters, ℓ
1	0.95
2	1.9
3	2.85
4	3.8
5	4.75

$+0.95$
$+0.95$
$+0.95$
$+0.95$

Let ℓ represent the liters and q represent the quarts.
The equation is $\ell = 0.95q$.

2. About how many liters are in 8 quarts?

$\ell = 0.95q$ Write the equation.

$\ell = 0.95(8)$ Replace q with 8.

$\ell = 7.6$ Multiply.

There are about 7.6 liters in 8 quarts.

A) $c = 4.50t$

B) $c = 4.50(15)$

     $c = \$67.50$

Got it? Do these problems to find out.

The total cost of tickets to the school play is shown in the table.

a. Write an equation to find the total cost of any number of tickets. Describe the relationship in words.

b. Use the equation to find the cost of 15 tickets.

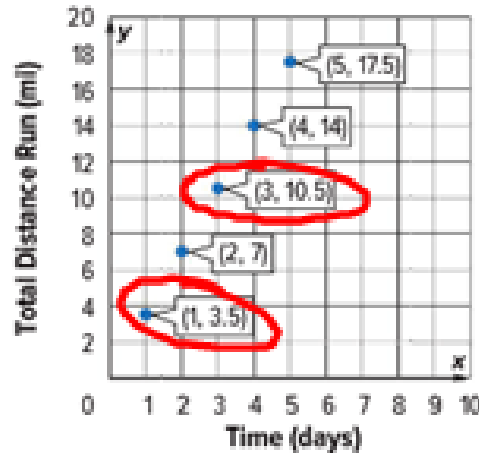| Number of Tickets, t	Total Cost (\$), c
1	4.50
2	9.00
3	13.50
4	18.00

+1 +4.5

$(1, 3.5)$ & $(3, 10.5)$

$$m = \frac{10.5 - 3.5}{3 - 1} = \frac{7}{2} = 3.5$$

The total distance Marlon ran in one week is shown in the graph.

3. Write an equation to find the number of miles ran y after any number of days x.

Total Distance Run (mi) vs Time (days)

(5, 17.5)
(4, 14)
(3, 10.5)
(2, 7)
(1, 3.5)

Find the rate of change or the slope of the line.

Step 1 $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ Definition of slope

$m = \dfrac{14 - 7}{4 - 2}$ $(x_1, y_1) = (2, 7); (x_2, y_2) = (4, 14)$

$m = \dfrac{7}{2}$ or 3.5   Simplify.

Step 2   To find the y-intercept, use the slope and the coordinates of a point to write the equation of the line in slope-intercept form.

$y = mx + b$ Slope-intercept form

$y = 3.5x + b$ Replace m with the slope, 3.5.

$7 = 3.5(2) + b$ Use the point (2, 7). $x = 2, y = 7$

$0 = b$ Solve for b.

4. How many miles will Marlon run after **2 weeks?**
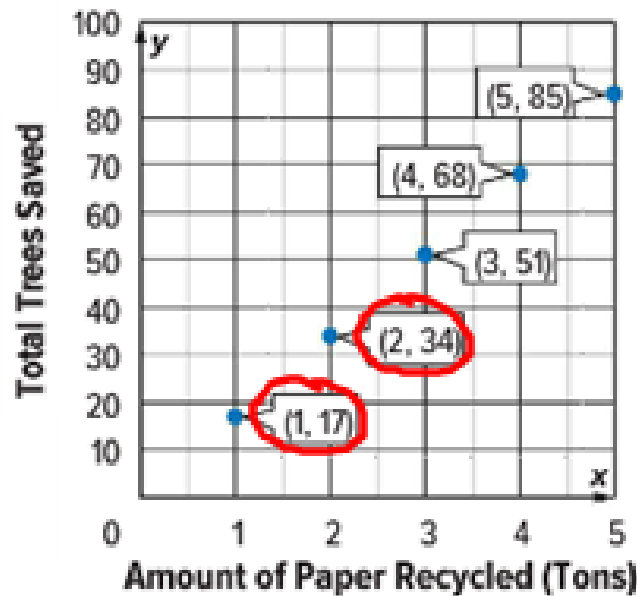
$y = 3.5x$ Write the equation.

$y = 3.5(14)$ There are 14 days in 2 weeks. Replace x with 14.

$y = 49$ Multiply.

Marlon will run 49 miles in 2 weeks.

Got it? Do these problems to find out.

The number of trees saved by recycling paper is shown.

c. Write an equation to find the total number of trees y that can be saved for any number of tons of paper x.

d. Use the equation to find how many trees could be saved if 500 tons of paper are recycled.

c) $(1, 17)$ & $(2, 34)$

$$m = \frac{34 - 17}{2 - 1} = \frac{17}{1} = 17$$

$34 = 17(2) + b$

$34 = 34 + b$

$-34 \quad -34$
_____

$0 = b$

$$\boxed{y = 17x}$$

D) $y = 17(500)$

$y = 8500 \text{ trees}$

Multiple Representations of Linear Equations

Words

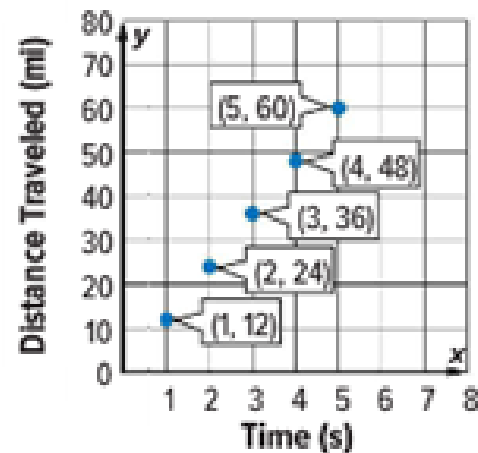Distance traveled is equal to 12 miles per second times the number of seconds.

Equation

$$d = 12s$$

Table

Time (seconds)	Distance (miles)
1	12
2	24
3	36
4	48
5	60

Graph

Words, equations, tables, and graphs can be used to represent linear relationships.

Chloe competes in jump rope competitions. Her average rate is 225 jumps per minute.

5. Write an equation to find the number of jumps in any number of minutes.

Let j represent the number of jumps and m represent the minutes.

The equation is $j = 225m$.

6. Make a table to find the number of jumps in 1, 2, 3, 4, or 5 minutes. Then graph the ordered pairs.

m	$225m$	j
1	225(1)	225
2	225(2)	450
3	225(3)	675
4	225(4)	900
5	225(5)	1,125
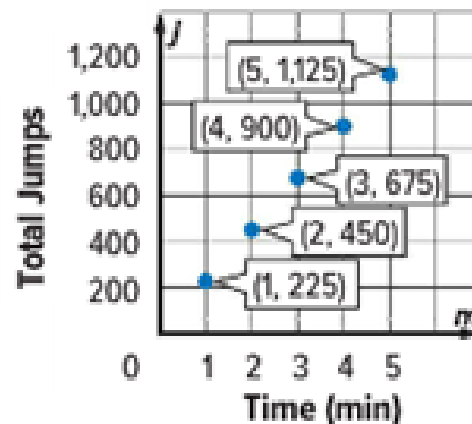
Financial Literacy Paul earns $25 for grooming a dog plus $18.50 per day for boarding the same dog. e) $m = 18.50d + 25$

e. Write an equation to find the amount of money Paul earned m for grooming a dog once and boarding it for any number of days d.

f. Make a table to find his earnings for 5, 6, 7, or 8 days. Then graph the ordered pairs.

d	$18.5d + 25$	m
5	$18.5(5) + 25$	117.50
6	$18.5(6) + 25$	136
7	$18.5(7) + 25$	154.50
8	$18.5(8) + 25$	173

Money

Days