

LESSON
5-1

Understanding Linear Functions

Reteach

The graph of a linear function is a straight line.

$Ax + By + C = 0$ is the **standard form** for the equation of a linear function.

- A , B , and C are real numbers. A and B are not both zero.
- The variables x and y
 - have exponents of 1;
 - are not multiplied together;
 - are not in denominators, exponents or radical signs.

Examples These are **NOT** linear functions:

$2 + 4 = 6$	no variable
$x^2 = 9$	exponent on $x \geq 1$
$xy = 8$	x and y multiplied together
$\frac{6}{x} = 3$	x in denominator
$2^y = 8$	y in exponent
$\sqrt{y} = 5$	y in a square root

Tell whether each function is linear or not.

1. $14 = 2\sqrt{x}$

2. $3xy = 27$

3. $14 = \frac{28}{x}$

4. $6x^2 = 12$

One way to tell if a function is linear is to make a table of x and y values and see if there is a constant change for each equal interval.

Complete each table. Tell if the change is constant for each equal interval. If so, what is the change?

5. $y - 2 = 3x$

x	-1	0	1	2
y	-1	2		

← Equal interval

Equal change? _____ Change? _____

6. $x^2 + 2y = 5$

x	-1	0	1	2
y	2	$\frac{5}{2}$		

← Equal interval

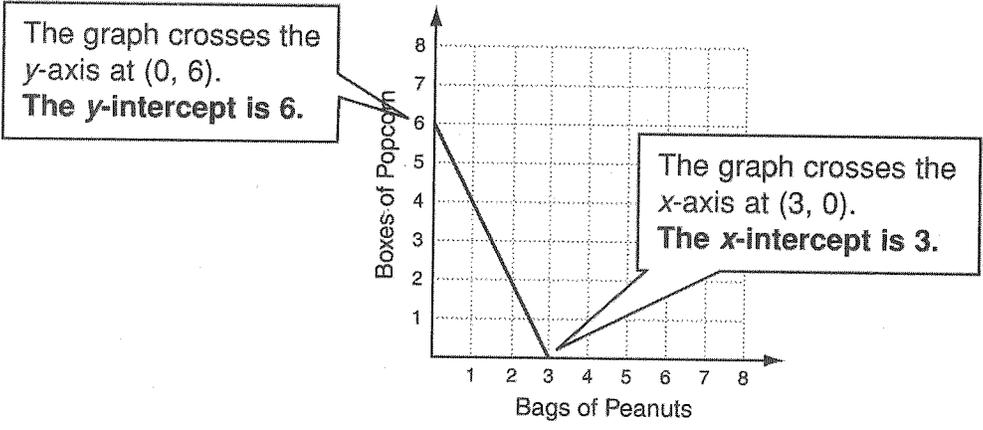
Equal change? _____ Change? _____

LESSON
5-2

Using Intercepts

Reteach

Doug has \$12 to spend on popcorn and peanuts. The peanuts are \$4 and popcorn is \$2. If he spends all his money, the equation $4x + 2y = 12$ shows the amount of peanuts, x , and popcorn, y , he can buy. Here is the graph of $4x + 2y = 12$.



To find the y-intercept, substitute $x = 0$. Solve for y .
He can buy 6 boxes of popcorn (y) if he buys 0 peanuts.
To find the x-intercept, substitute $y = 0$. Solve for x .
He can buy 3 bags of peanuts (x) if he buys 0 popcorn.

$$4(0) + 2y = 12$$

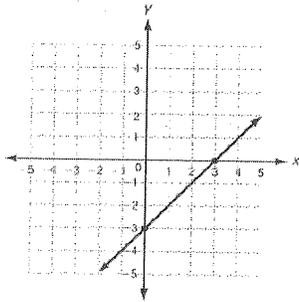
$$y = 6$$

$$4x + 2(0) = 12$$

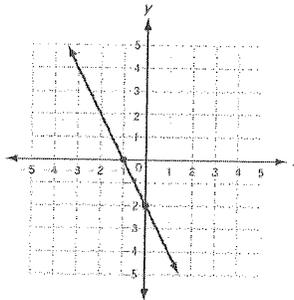
$$x = 3$$

Find each x- and y-intercept.

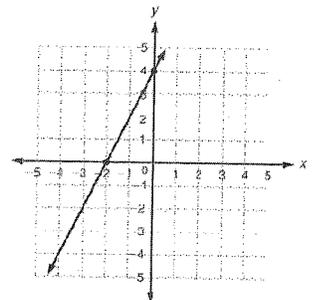
1.



2.

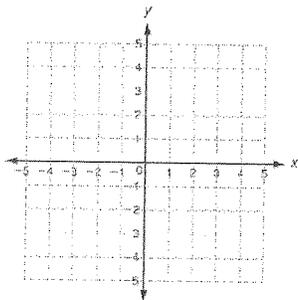


3.

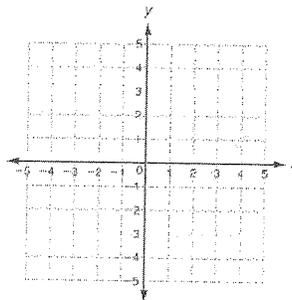


Find each intercept. Use these two points to graph each line.

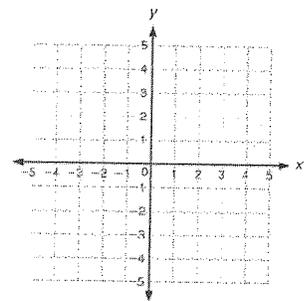
4. $3x + 9y = 9$



5. $4x + 6y = -12$



6. $2x - y = 4$



LESSON
5-3

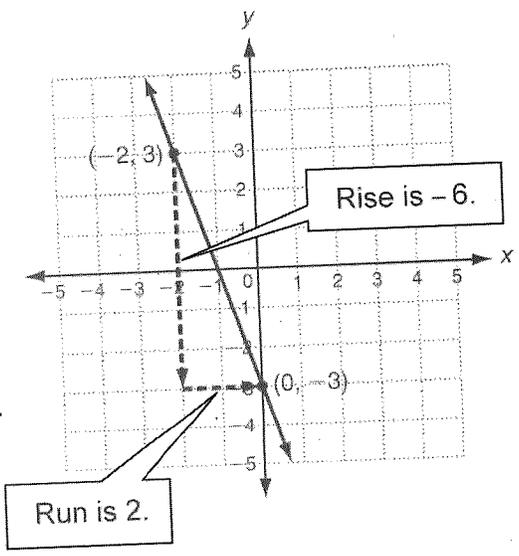
Interpreting Rate of Change and Slope

Reteach

Find the rate of change, or **slope**, for the graph of a straight line by finding $\frac{\text{change in } y}{\text{change in } x}$.

- Step 1:** First choose any two points on the line.
- Step 2:** Begin at one of the points.
- Step 3:** Count vertically until you are even with the second point.
This is the rise. If you go down the rise will be negative. If you go up the rise will be positive.
- Step 4:** Count over until you are at the second point.
This is the run. If you go left the run will be negative. If you go right the run will be positive.
- Step 5:** Divide to find the slope.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-6}{2} = -3$$



The **slope of a horizontal line is zero**. A horizontal line has no steepness at all.
The **slope of a vertical line is undefined**. A vertical line is infinitely steep.

Find the slope of each line.

