5th Hour

Lesson 5

Graph a Line Using Intercepts

What You'll Learn

Scan the lesson. Predict two things you will learn about intercepts.

- _____

_____

- _____

_____

Essential Question

WHY are graphs helpful?

Vocabulary

x-intercept
standard form

Common Core State Standards

Content Standards
Preparation for 8.EE.8c

Mathematical Practices
1, 3, 4

Real-World Link

Watch

Movies Mrs. Hodges spent $80 on movie tickets and drinks for her son and his friends. The total cost of x movie tickets and y drinks is represented by the equation $8x + 4y = 80$.

Item	Cost
ticket	$8
drink	$4

1. Complete the steps below to write the equation in slope-intercept form.

$$8x + 4y = 80$$

$$\frac{\square}{\square} = \frac{\square}{\square}$$

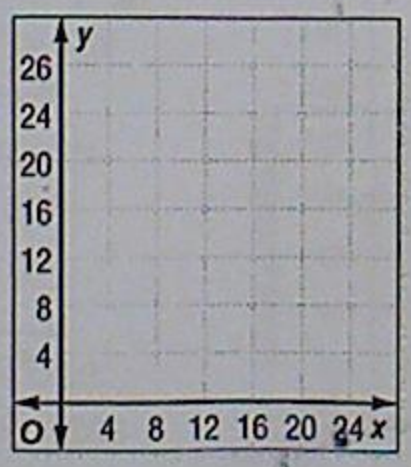
$$\frac{4y}{\square} = \frac{80 - 8x}{\square}$$

$$y = 20 - 2x$$

$$y = \square x + \square$$

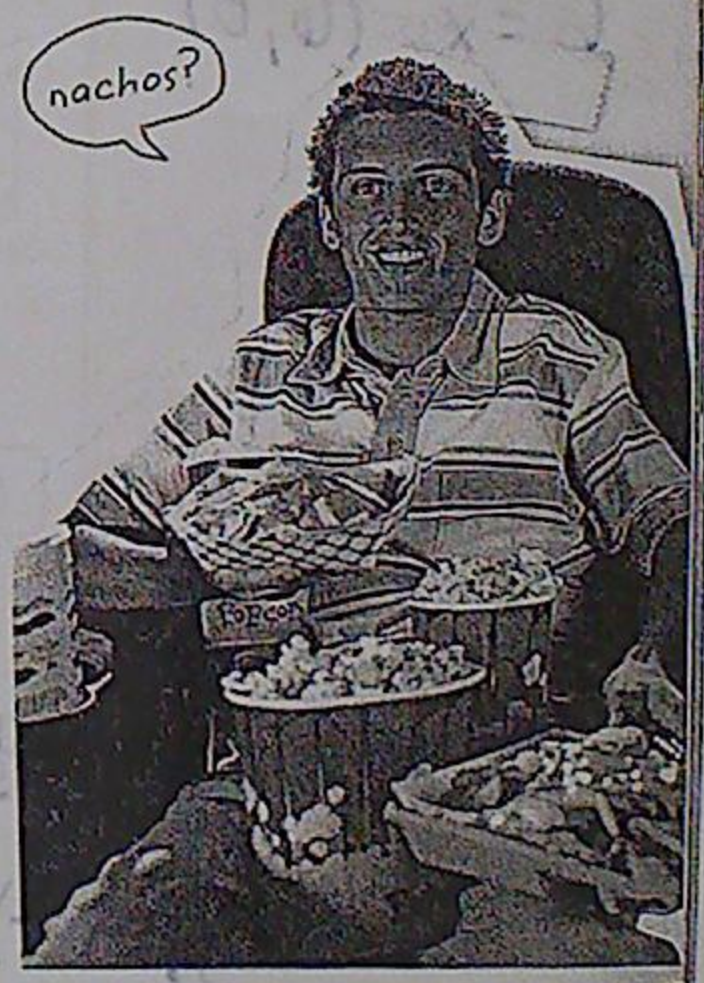
slope — y-intercept

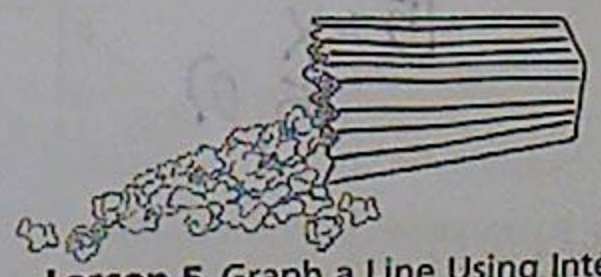
2. Graph the equation.



3. What does the point (0, 20) represent?

_____





Slope-Intercept Form

The *x*-intercept of a line is the *x*-coordinate of the point where the graph crosses the *x*-axis. Since any linear equation can be graphed using two points, you can use the *x*- and *y*-intercepts to graph an equation.

Example

Tutor

$y = mx + b$

1. State the *x*- and *y*-intercepts of $y = 1.5x - 9$. Then use the intercepts to graph the equation.

Step 1 First find the *y*-intercept.

$y = 1.5x + (-9)$ Write the equation in the form $y = mx + b$.

$b = -9$

Step 2 To find the *x*-intercept, let $y = 0$.

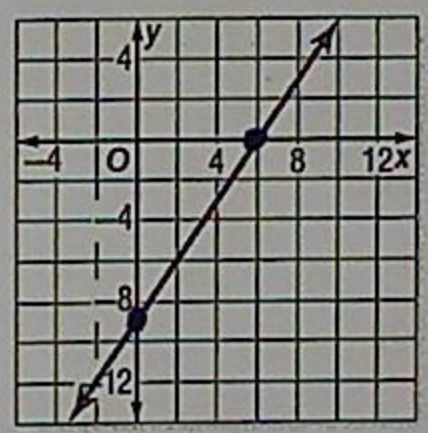
$0 = 1.5x - 9$ Write the equation. Let $y = 0$.

$9 = 1.5x$ Addtion Property of Equality

$\frac{9}{1.5} = \frac{1.5x}{1.5}$ Division Property of Equality

$6 = x$ Simplify.

Step 3 Graph the points (6, 0) and (0, −9) on a coordinate plane. Then connect the points.



① Find the y-int.
(0, b)
(0, -9)

② Put y=0 into the equation and get x by itself (Solve for x if y=0)

$0 = 1.5x - 9$
$+9 \quad +9$
$9 = 1.5x$
$\frac{9}{1.5} = \frac{1.5x}{1.5}$
$6 = x \quad (6, 0)$

Show your work.

Got It? Do these problems to find out.

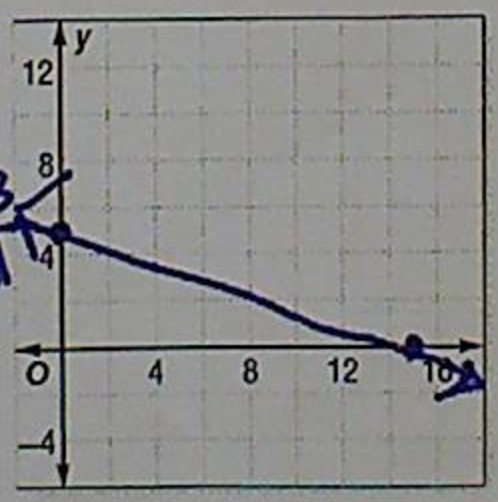
a. $y = -\frac{1}{3}x + 5$ $y = mx + b$ (0, 5) yint

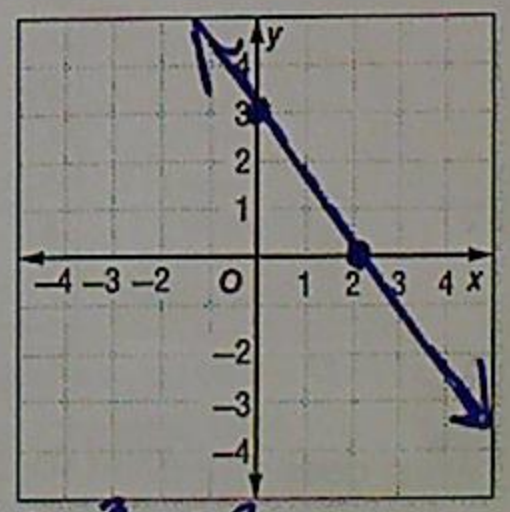
b. $y = -\frac{3}{2}x + 3$ (0, b) yint (0, 3)

a. y-int = 5
x-int = 15

b. y-int = 3
x-int = 2

$0 = -\frac{1}{3}x + 5$
$-5 \quad -5$
$-3 \cdot -5 = -\frac{1}{3}x \cdot -3$
$15 = x$
(15, 0)





(2, 0)

$0 = -\frac{3}{2}x + 3$
$-3 \quad -3$
$-3 = -\frac{3}{2}x \cdot -\frac{2}{3}$
$x = \frac{6}{3} = 2$