Pg. 350

#14) $m_{DE} = -\frac{4}{2} = -2$ $\quad m_{DG} = \frac{3}{3} = 1$

$m_{EF} = \frac{4}{4} = 1$ $\quad m_{GF} = -\frac{5}{1} = -5$

Trapezoid: 1 pair of $\parallel$ sides $\{DG \parallel EF\}$

23. A(3,5) B(7,10) C(0,a) D(1,a)

a) $m_{AB} = \frac{5}{4}$ $m_{CD} = \frac{a-2}{1}$

$\overleftrightarrow{AB} \uparrow\uparrow \overleftrightarrow{CD}$

$\therefore \frac{5}{4} = a-2$

$5 = 4(a-2)$

$5 = 4a - 8$

$\frac{13}{4} = \frac{4a}{4}$

$\frac{13}{4} = a$

b) $-\frac{4}{5} = (a-2)$

$-4 = 5a - 10$

$\frac{6}{5} = \frac{5a}{5}$

$\frac{6}{5} = a$

6.4 Slope-Intercept Form of the Equation for a Linear Function

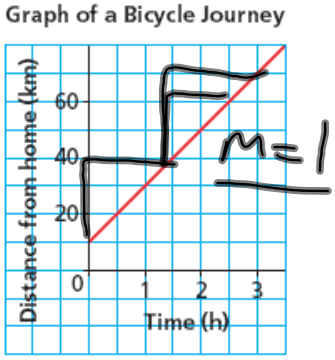
LESSON FOCUS Relate the graph of a linear function to its equation in slope-intercept form.

Make Connections

This graph shows a cyclist's journey where the distance is measured from her home.

What does the vertical intercept represent?

What does the slope of the line represent?

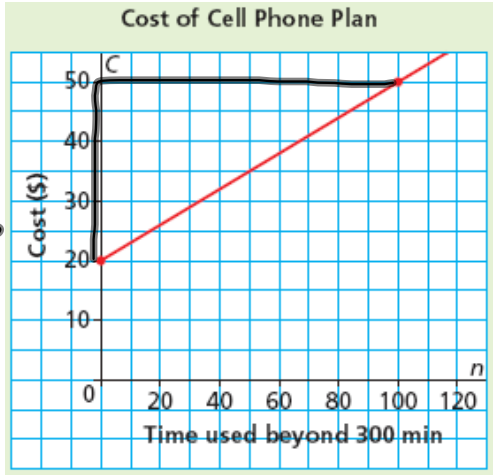


$$m = \frac{\Delta y}{\Delta x} = \frac{\Delta d}{\Delta t}$$

$$= \frac{30\text{ km}}{1.5\text{ h}}$$

$$= 20\text{ km/h}$$

How do you know this is the graph of a linear function?
What does the slope of the graph represent?



$m = \frac{\Delta \text{Cost (\$)}}{\Delta \text{time (min)}} = \text{cost/minute}$

$= \frac{\$30}{100 \text{ minutes}} = 0.30/\text{minute}$

Write an equation to describe this function.
Verify that your equation is correct.

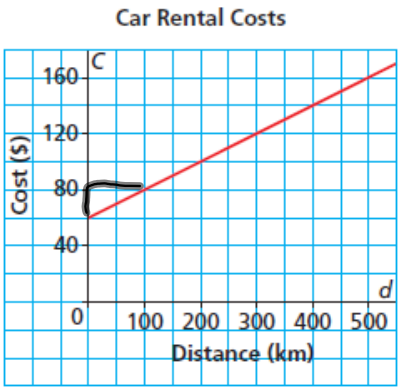
$C = 20 + 0.3n$

$C = 0.3n + 20$

m = (slope)

y-Intercept

In Chapter 5, Lesson 5.6, we described a linear function in different ways. The linear function below represents the cost of a car rental.



An equation of the function is:
$C = 0.20d + 60$

The number 0.20 is the rate of change, or the slope of the graph. This is the cost in dollars for each additional 1 km driven.

The number 60 is ?

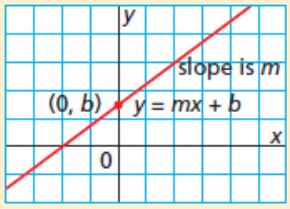
$C = 0.2d + 60$

$m = \frac{\$20}{100\text{ km}} = 0.20/\text{km}$

In general, any linear function can be described in **slope-intercept form.**

Slope-Intercept Form of the Equation of a Linear Function

The equation of a linear function can be written in the form $y = mx + b$, where m is the slope of the line and b is its y-intercept.



Slope y-Intercept form

$y = mx + b$

slope

y-Intercept

x-Intercept: $x = -\frac{b}{m}$

6.4 Slope-Intercept Form of the Equation for a Linear Function

$y = -2x + 7$

y-Int: $y = 7$

$0 = -2x + 7$

$\frac{-7}{-2} = \frac{-2x}{-2}$

x-Intercept: $\frac{7}{2} = x$

Example 1 Writing an Equation of a Linear Function Given Its Slope and *y*-Intercept

The graph of a linear function has slope $\frac{3}{5}$ and y-intercept -4.

Write an equation for this function.

$y = mx + b$

$y = \frac{3}{5}x - 4 \Rightarrow (x, y)$

$(-1, 3) \Rightarrow 3 = \frac{3}{5}(-1) - 4$

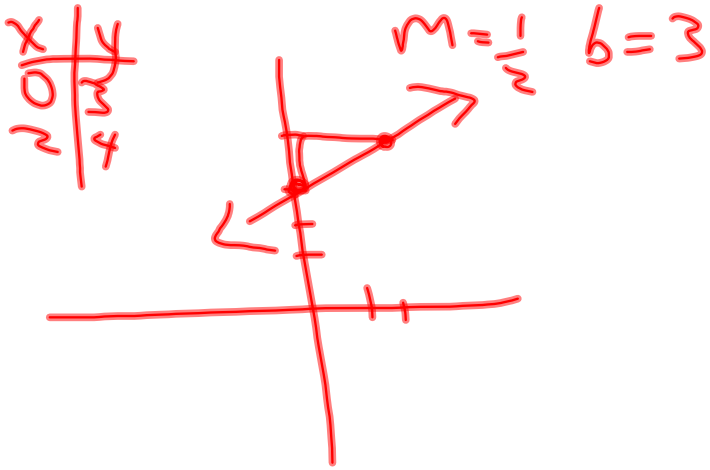
1. The graph of a linear function has slope $-\frac{7}{3}$ and y-intercept 5.

Write an equation for this function.

$y = -\frac{7}{3}x + 5$

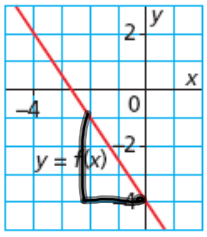
Example 2 Graphing a Linear Function Given Its Equation in Slope-Intercept Form

Graph the linear function with equation: $y = \frac{1}{2}x + 3$



Example 3 Writing the Equation of a Linear Function Given Its Graph

Write an equation to describe this function. Verify the equation.

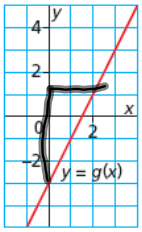


$y = -\frac{3}{2}x - 4$

$m = -\frac{3}{2}$

$b = -4$

3. Write an equation to describe this function. Verify the equation.



$y = 2x - 3$

$(3, 3) \rightarrow$ check: $3 \mid 2(3) - 3$

3

$b = -3$

$m = \frac{4}{2} = 2$

Example 4 Using an Equation of a Linear Function to Solve a Problem

The student council sponsored a dance. A ticket cost $5 and the cost for the DJ was $300.

a) Write an equation for the profit, P dollars, on the sale of t tickets.

b) Suppose 123 people bought tickets. What was the profit?

c) Suppose the profit was $350. How many people bought tickets?

d) Could the profit be exactly $146? Justify the answer.

(a) $P = 5t - 300$

(b) $P = 5(123) - 300$
$= 315$

(c) $350 = 5t - 300$
$\frac{650}{5} = \frac{5t}{5}$
$t = 130$

$146 = 5t - 300$
$\frac{446}{5} = \frac{5t}{5}$
$t \in N$

Slope - Y Intercept Form

- is of the form... $y = mx + b$, where m is the slope
  b is the y intercept
- if you are given **m** and **b**, then you can get the equation of the line.

ex: Determine the **slope** and **y-intercept** of the following line.

$y = mx + b$

$3(2y - 1) = -2(x + 5)$

$6y - 3 = -2x - 10$

$6y = -2x - 10 + 3$

$\frac{6y}{6} = \frac{-2x}{6} - \frac{7}{6}$

$y = \frac{-1}{3}x - \frac{7}{6}$

$y = mx + b$

slope $= -\frac{1}{3}$

y-Int. $= -\frac{7}{6}$

x-Int. $\left(-\frac{7}{2}, 0\right)$

y-Int. $\left(0, -\frac{7}{6}\right)$

$m = \frac{-\frac{7}{6} - 0}{0 - \left(-\frac{7}{2}\right)} = \frac{\left(-\frac{7}{6}\right)}{\frac{7}{2}}$

$= -\frac{7}{6} \cdot \frac{2}{7} = -\frac{2}{6} = -\frac{1}{3}$

ex: sketch the line that passes through the points (3, -4) & (0, 4)

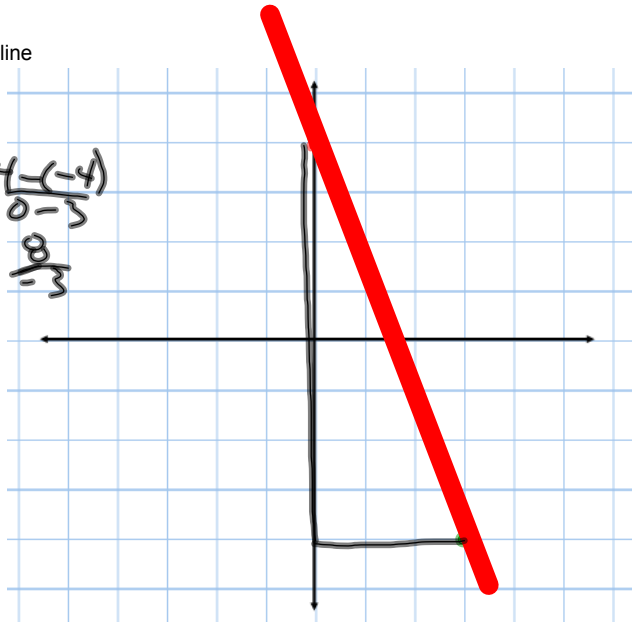
- Determine the equation of this line

y-Int: 4

$m = -\frac{8}{3}$

$y = -\frac{8}{3}x + 4$

$m = \frac{4 - (-4)}{0 - 3} = \frac{8}{-3}$



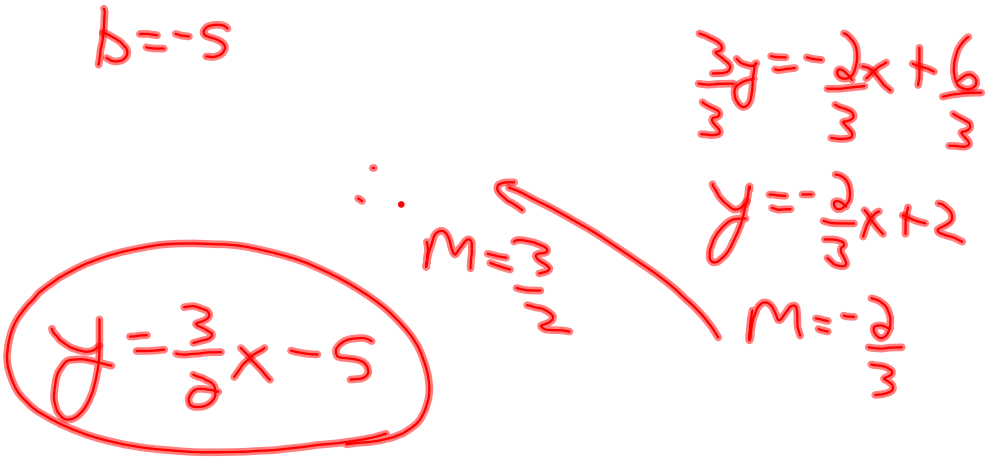
Finding the Equation of a Line

Method #1: Slope - Y Intercept Method

$$y = mx + b$$

Need: (1) the slope & (2) the *y*-intercept

Example... Determine the equation of a line that passes through the point (0, -5) and is perpendicular to the line 2x + 3y = 6.



Practice Problems...

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