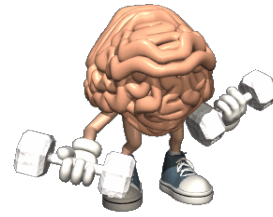


Warm Up



1a) What is the slope of a line that passes through the points (14, -18) and (8, -20)?

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-20 - (-18)}{8 - (14)}$$

$$= \frac{-20 + (+18)}{8 + (-14)}$$

$$= \frac{-2}{-6}$$

$$m = \frac{1}{3}$$

Rules
for
subtracting
integers

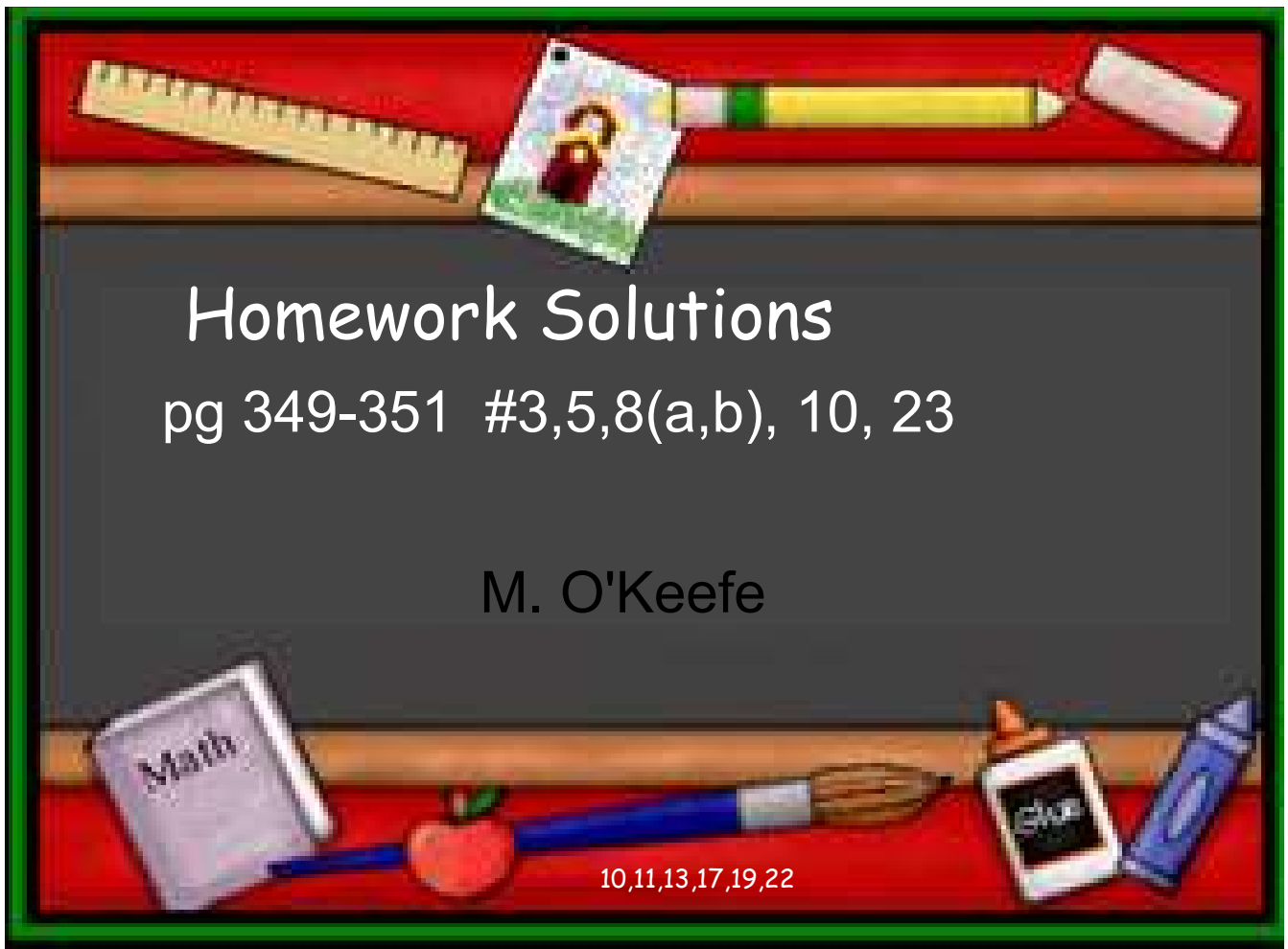
b) What is the slope of a line perpendicular to a line that passes through the points (5, 3) and (-12, 6)?

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{6 - 3}{-12 - 5}$$

$$m = \frac{3}{-17}$$

$$m_{\perp} = +\frac{17}{3}$$



3. The slopes of lines are given below. For each line, what is the slope of a parallel line? **parallel**

a) $\frac{4}{5}$

$$m_{//} = \frac{4}{5}$$

b) $-\frac{4}{3}$

$$m_{//} = -\frac{4}{3}$$

c) 3 $m_{//} = 3$

d) 0 $m_{//} = 0$



5. The slopes of two lines are given. Are the two lines parallel, perpendicular, or neither?

a) 4, 4

same
parallel

b) $\frac{1}{6}, 6$

reciprocal
but
not
opposite
so neither

←  parallel

perpendicular

c) $\frac{7}{8}, -\frac{7}{8}$

opposite in sign
but not reciprocal
neither

d) $\frac{1}{10}, -10$

opp recip
Perpendicular

$$8a) \Rightarrow A(\overset{x_1}{-5}, \overset{y_1}{-2}) \quad B(\overset{x_2}{1}, \overset{y_2}{5})$$

$$C(-1, -4) \quad D(4, 1)$$

$$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{5 - (-2)}{1 - (-5)}$$

$$= \frac{5 + 2}{1 + 5}$$

$$= \frac{7}{6}$$

$$=$$

neither

$$m_{CD} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{1 - (-4)}{4 - (-1)}$$

$$= \frac{1 + 4}{4 + 1}$$

$$= \frac{5}{5}$$

$$= +1$$

$$8b) \begin{array}{ll} E(-3, 4) & F(3, 2) \\ G(2, 5) & H(6, -1) \end{array}$$

$$m_{EF} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{2 - 4}{3 - (-3)}$$
$$= \frac{2 - 4}{3 + 3}$$

$$= \frac{-2}{6}$$

Reduce

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

$$m_{GH} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-1 - 5}{6 - 2}$$

$$= \frac{-6}{4}$$

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

opposite
reciprocals
so
perpendicular

$EF \perp GH$

10. How are the lines in each pair related? Justify your answer.
- a) DE has an x -intercept of 4 and a y -intercept of -6 .
FG has an x -intercept of -6 and a y -intercept of 4.
- b) HJ has an x -intercept of -2 and a y -intercept of 3.
KM has an x -intercept of -9 and a y -intercept of 6.

$$\begin{array}{l} \text{a) } x\text{-inter} \quad (4, 0) \\ \quad \quad \quad y\text{-int} \quad (0, -6) \end{array} \quad m_{AB} = \frac{-6 - 0}{0 - 4}$$
$$= \frac{-6}{-4}$$
$$= \frac{3}{2}$$

$$F(-6, 0) \quad G(0, 4)$$
$$m = \frac{4 - 0}{0 - (-6)}$$
$$= \frac{4}{6}$$
$$= \frac{2}{3}$$

M. O'Keefe

23. Given A(3, 5), B(7, 10), C(0, 2), and D(1, a), determine the value of a for which:

Same slope

a) Line AB is parallel to line CD.

A(3, 5) B(7, 10)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10 - 5}{7 - 3}$$

$$m = \frac{5}{4}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{5}{4} = \frac{a - 2}{1 - 0}$$

$$\frac{5}{4} = \frac{a - 2}{1}$$

$$5 = 4(a - 2)$$

$$5^{+8} = 4a - 8^{+8}$$

$$13 = 4a$$

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

$$5 = 4(a - 2)$$

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

$$\frac{5}{4} + 2 = a$$

$$\frac{5}{4} + \frac{8}{4} = a$$

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

(0, 2) (1, $\frac{13}{4}$)

$$m = \frac{5}{4}$$

$$m_{\perp} = -\frac{4}{5}$$

$$C(0, 2) \quad D(1, a)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$-\frac{4}{5} = \frac{a - 2}{1 - 0}$$

$$-\frac{4}{5} = \frac{(a - 2)}{1}$$

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

$$\frac{-4}{5} + \frac{2}{1} = a$$

$$\frac{-4}{5} + \frac{10}{5} = a$$

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

$$\frac{5}{4} = \frac{a-2}{1}$$

$$\cdot \frac{5}{4} + 2 = a - 2 + 2$$

$$\frac{5}{4} + \frac{2}{1} = a$$

$$\frac{5}{4} + \frac{8}{4} = a$$

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

slope

Intercept Form

$$y = mx + b$$

$$y = mx + b$$

Slope (m)

y-intercept (b)

also have a point
(0, y)

1) Given $y = -\frac{1}{2}x + 5$

$$y = mx + b$$

What is the slope and the y-intercept? (Write the y-intercept as an ordered pair)

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

$$b = 5$$

$$(0, 5)$$

2) Given $y = 2x - 7$

$$y = mx + b$$

What is the slope and the y-intercept? (Write the y-intercept as an ordered pair)

$$m = 2$$

$$b = -7$$

$$(0, -7)$$

3) Write the equation of a line given $m = 2$ and a point of the line is $(0, -3)$

y-intercept
because $x = 0$

$$b = -3$$

$$m = 2$$

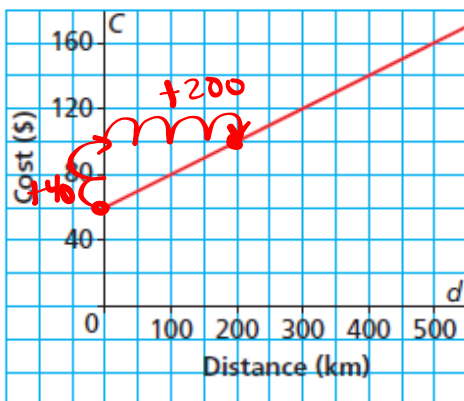
$$y = mx + b$$

$$y = 2x - 3$$

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.



Car Rental Costs



An equation of the function is:

$$C = 0.20d + 60$$

$$y = mx + b$$

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 *y* intercept (the value at $d = 0$ km)

Slope should be written as a fraction. Looking at the graph what is the rate of change as a fraction? (Reduce fractions)

$$\frac{40}{200} = \frac{20}{100} = \frac{1}{5}$$

Use this to rewrite the equation of the line.

$$y = \frac{1}{5}x + 60$$

$$C = \frac{1}{5}d + 60$$

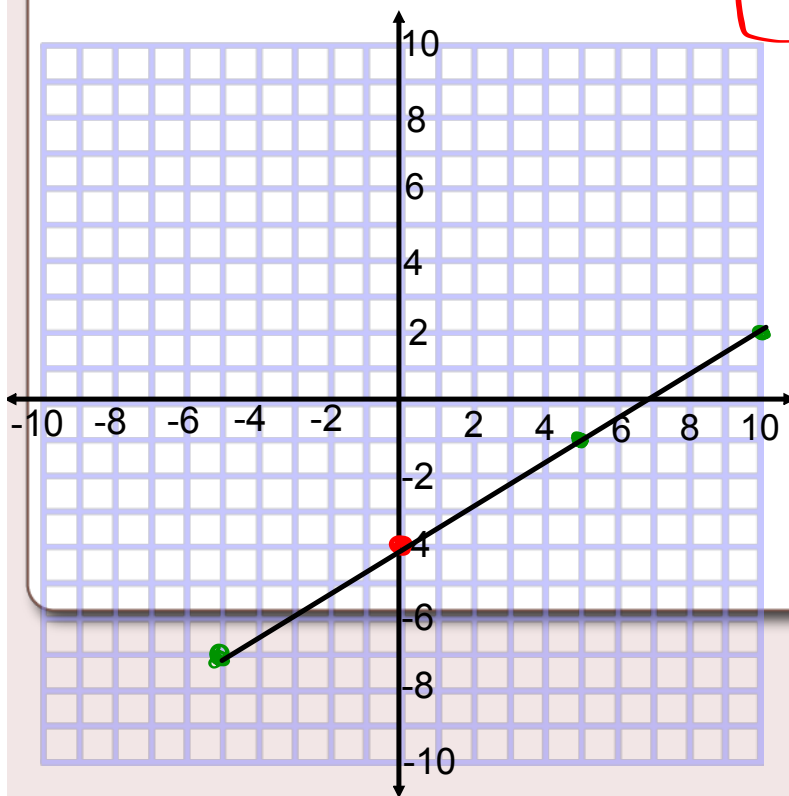
Example 1**Writing an Equation of a Linear Function
Given Its Slope and y-Intercept**

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

Write an equation for this function.

$$y = \frac{3}{5}x - 4$$

$(0, -4)$
↑



Graph the following

To graph a line you need :

i) One point $(0, -4)$

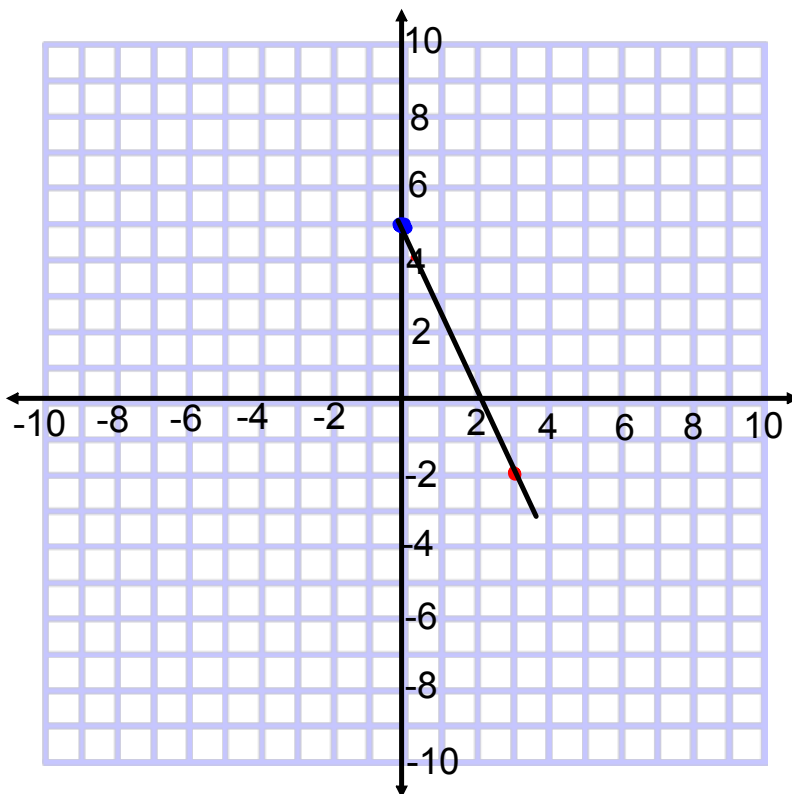
ii) Slope

$$m = \frac{3}{5} \quad \begin{array}{l} \text{rise} \\ \text{run} \end{array}$$
$$= \frac{+3}{+5} \text{ or } -\frac{3}{5}$$

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



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



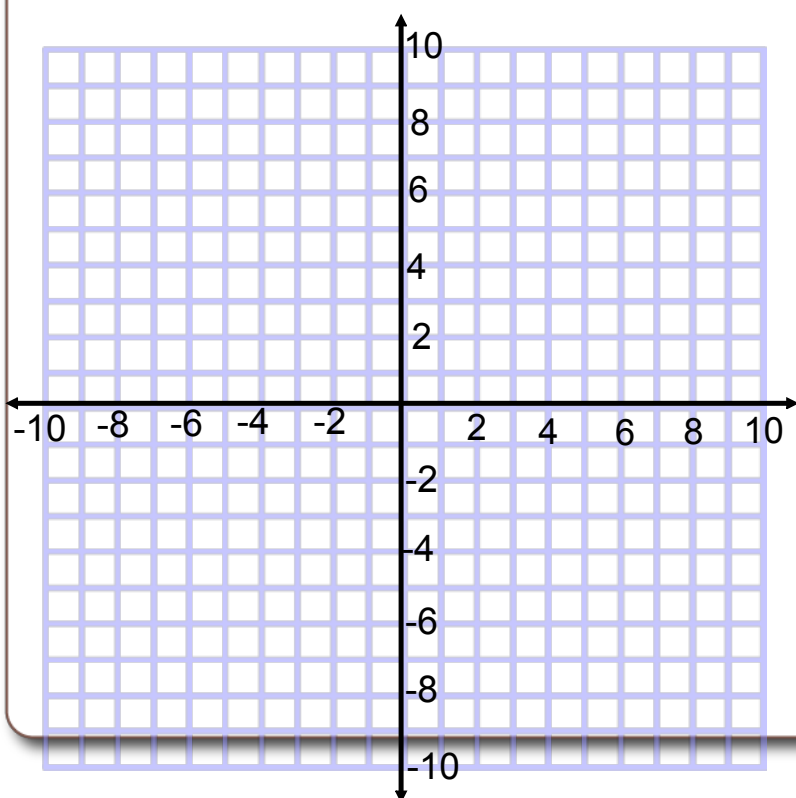
$$b = 5 \quad (0, 5)$$

$$m = -\frac{7}{3} \text{ or } \frac{7}{-3}$$

↓
Down 7, Right 3

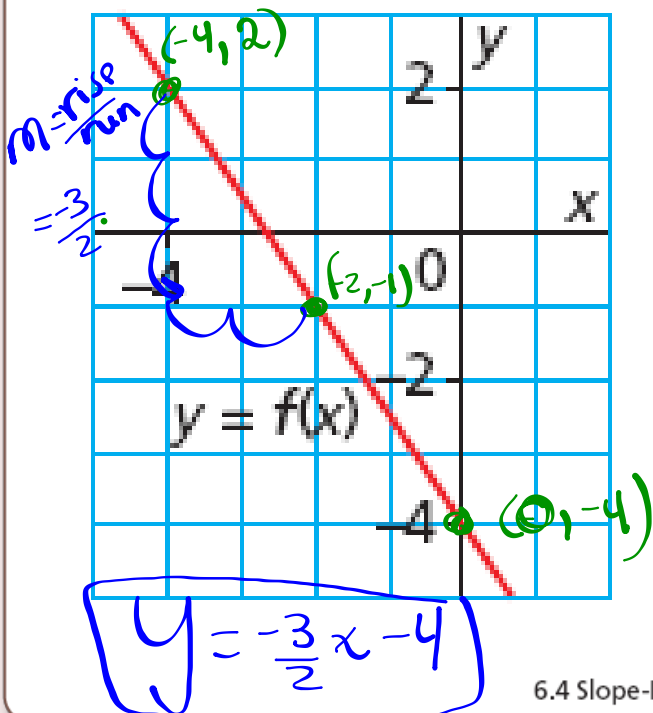
Example 2**Graphing a Linear Function Given Its Equation in Slope-Intercept Form**

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.



$$\begin{array}{cc} x_1 & y_1 & x_2 & y_2 \\ (-4, 2) & & (2, -1) & \end{array}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

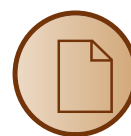
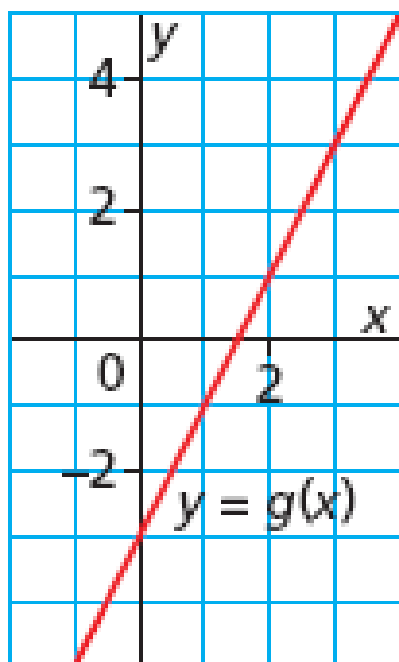
$$= \frac{-1 - 2}{-2 + 4}$$

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

$$b = -4$$



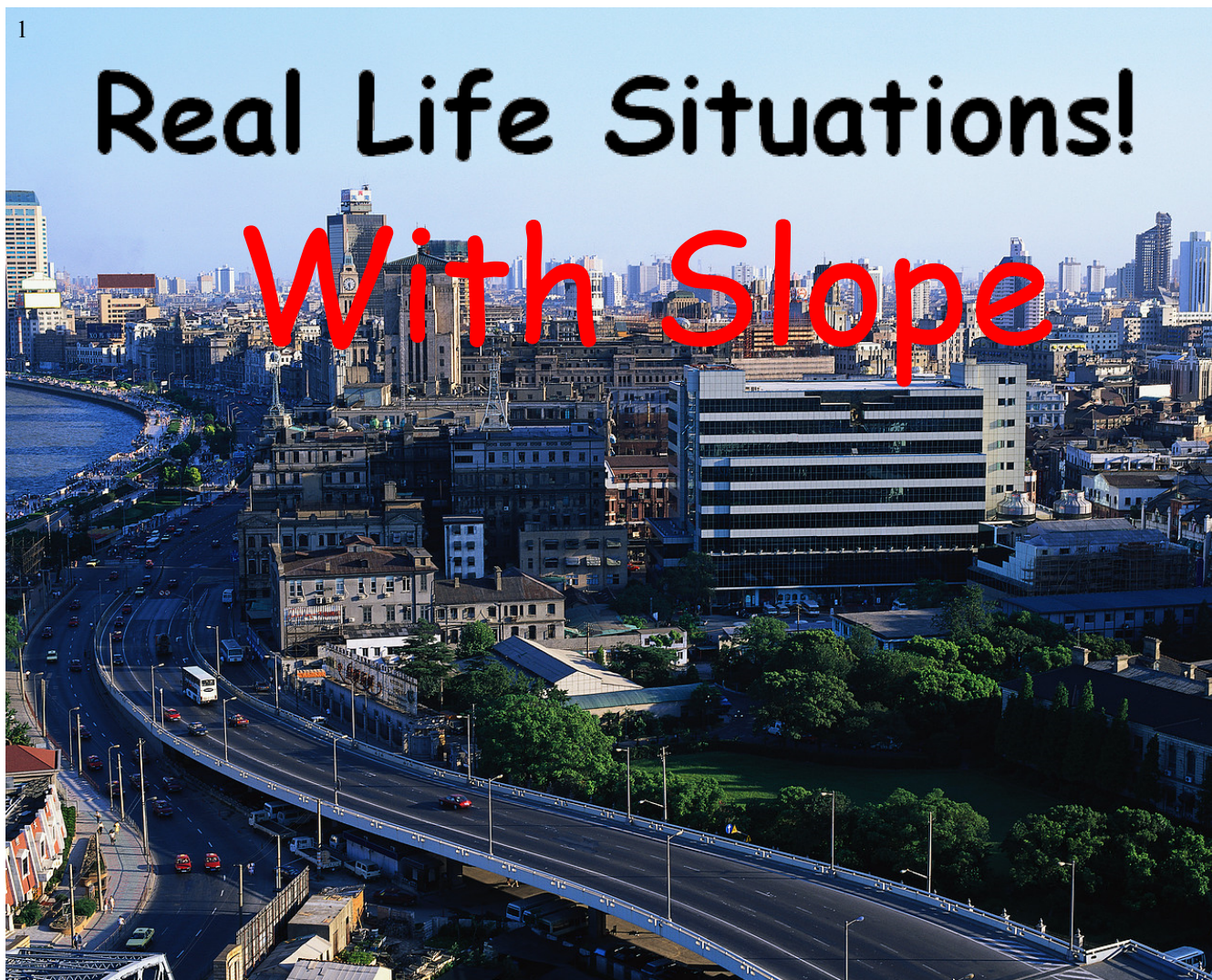
3. Write an equation to describe this function. Verify the equation.



1

Real Life Situations!

With Slope



2

Key words \rightarrow per (/)
 for every
 for each \rightarrow goes with variable

Ashely babysits on the weekend to make extra money. She charges \$15 as a flat rate and then \$5 every hour. Write an equation that represents the total pay she will make at the end of each babysitting job.

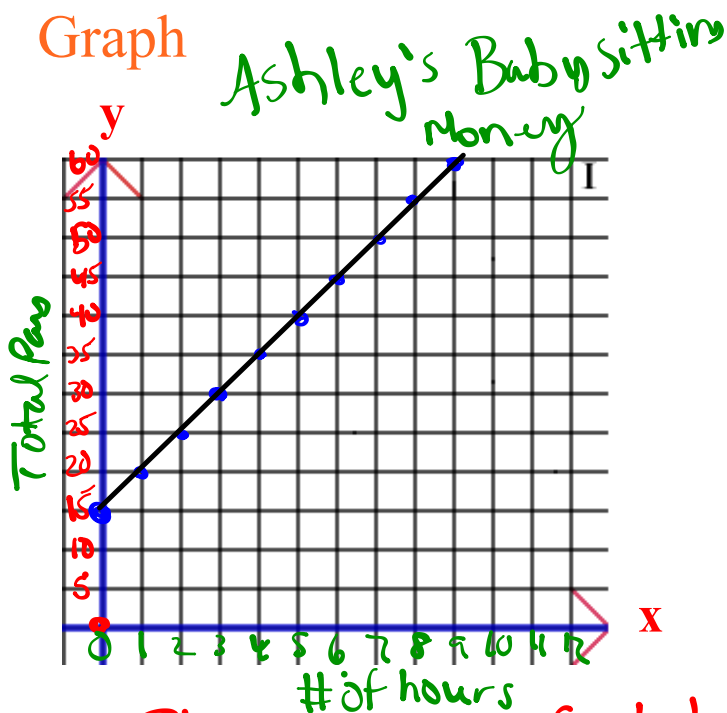
Where
 T represent Total earnings
 h represent # of hours worked

$y = mx + b$
 \uparrow for every for each per
 \leftarrow flat rate initial cost

$$T = 5h + 15$$

3

Ashely babysits on the weekend to make extra money. She charges \$15 as a flat rate and then \$5 every hour.



$$b = 15$$

$$m = 5$$

$$x =$$

$$y =$$

$$y = 5x + 15$$

Equation

$$y = mx + b$$

Should get paid for $\frac{1}{2}$ hour so connect dots.

1. How much would it cost to have Ashley babysit for 3 hours?
2. How many hours could you have Ashley babysit for if you had \$45?

$$y = mx + b$$

Slope (m) = Cost per hour, Cost per Km, Cost per picture, etc....

y-intercept (b) = Initial cost, base rate, initial fee, flat rate, sitting fee, starting cost etc.....

x = Number of kilometers, Number of hours, Number of pictures, etc....

y = Total Cost \$\$\$\$, Total Earned \$\$\$

