#7

Name Key
Math 8R

Date ____________
Period ____________

# Real World Functions - Day 2

1. A social networking site charges $40 for 2,000 page views of a banner advertisement. The site also charges $100 for 5,000 page views of a banner advertisement.

a) Determine the rate of change for the function. $\frac{1}{50}$

Slope (m)

y ($) (Dep)
pg views x (Ind)

$ tops (always y)
x = pg views
y = $

(2000, 40) (5000, 100)
$x_1$ $y_1$ $x_2$ $y_2$

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

$$m = \frac{100-40}{5000-2000}$$

$$m = \frac{60}{3000}$$

$$m = \frac{1}{50}$$

b) Explain what the rate of change means in terms of this scenario.

$\frac{\Delta y}{\Delta x} = \frac{\text{\$ charged}}{\text{pg views}} = \frac{1}{50}$

For every $1 you get 50 page views of a banner advertisment (The company charges $1 for 50 views)

c) Determine the y-intercept for the function. 0

(b)

(2,000, 40)
x g

$m = \frac{1}{50}$

$$y = mx + b$$

$$40 = \frac{1}{50}(2000) + b$$

$$40 = 40 + b$$

$$-40 \quad -40$$

$$0 = b$$

d) Explain what the y-intercept means in terms of this scenario.

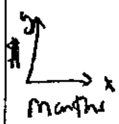
(fee / Starting value)

The site does not charge its customers a fee for a page with no views

e) Write the equation for the function. $y = \frac{1}{50}x$

$y = mx + b$
$m = \frac{1}{50}$
$b = 0$

2. Shantell saves the same amount of money each month in her bank's savings account. The amounts of money she has saved after different number of months are shown in the following table.




| Months of Saving, x | Total Amount Saved (in $), y |
|---|---|
| 4 | 1100 |
| 6 | 1400 |
| 8 | 1700 |
| 10 | 2000 |

Slope (m)

a) Determine the rate of change for the function. 150

(4, 1100) (6, 1400)
$x_1$ $y_1$ $x_2$ $y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{1400 - 1100}{6 - 4}$ $m = \frac{300}{2}$ $m = 150$

b) Explain what the rate of change means in terms of this scenario. $\frac{\Delta y}{\Delta x} = \frac{\text{\$ saved}}{\text{month}} = \frac{150}{1}$

Shantell saves $150 per month

initial value (b)

c) Determine the y-intercept for the function. 500

(4, 1100)
x y

m = 150

$y = mx + b$
$1100 = 150(4) + b$
$1100 = 600 + b$
$-600 \quad -600$
$500 = b$

initial/starting value (b)

d) Explain what the y-intercept means in terms of this scenario.

Shantell started out with $500 in her account

e) Write the equation for the function. $y = 150x + 500$

$y = mx + b$
$m = 150$
$b = 500$

3. Elizabeth can choose from several monthly cell phone plans. The cost of each plan is a linear function of the number of minutes that are included in the plan. The table below represents the cost for the cell phone plan.

| Minutes Included, x | 100 | 200 | 300 | 400 | 500 |
|---|---|---|---|---|---|
| Cost of Plan ($), y | 18 | 28 | 38 | 48 | 58 |

$\frac{\Delta y}{\Delta x} = \frac{10}{100} = \frac{1}{10}$

$\frac{\$}{\text{min}} = \frac{1}{10}$

a) Write an equation in slope-intercept form that represents the function.

$(100, 18)\ (200, 28)$
$x_1\ y_1\quad x_2\ y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{28-18}{200-100}$ $m = \frac{10}{100}$ $m = \frac{1}{10}$

$(100, 18)$
$x\ y$
$m = \frac{1}{10}$

$y = mx + b$
$18 = \frac{1}{10}(100) + b$
$18 = 10 + b$
$-10\quad -10$
$8 = b$

$y = mx + b$
$m = \frac{1}{10}$
$b = 8$

$\boxed{y = \frac{1}{10}x + 8}$

b) Use the equation to predict the cost of a cell phone plan that includes 175 minutes.

x

$y = \frac{1}{10}x + 8$
$y = \frac{1}{10}(175) + 8$
$y = 17.5 + 8$
$y = 25.5$

$\boxed{\$25.50}$

c) What is the base price for any cell phone plan, regardless of how many minutes are included?

fee
(y-int/starting value)
(b)

$\boxed{\$8}$

4. When Eduardo works for 3 hours at his job, he earns a total of $28.50. When he works for 5 hours, he earns a total of $47.50.

y $ (dep) hours x (ind) $ hrs $x$ = hrs $y$ = $ $(3, 28.50)\ (5, 47.50)$

Create the equation for a function to represent the linear relationship between the number of hours Eduardo works and the total amount of money he earns.

$y = mx + b$
$m = 9.50$
$b = 0$

$\boxed{y = 9.50x}$

$(3, 28.50)\ (5, 47.50)$
$x_1\ y_1\quad x_2\ y_2$

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

$m = \frac{47.50 - 28.50}{5 - 3}$

$m = \frac{19}{2}$

$(3, 28.50)$
$x\ y$
$m = 9.5$

$y = mx + b$
$28.50 = 9.5(3) + b$
$28.50 = 28.50 + b$
$-28.50\quad -28.50$
$0 = b$

would make $0 for 0 hours worked

$m = 9.5$

5. A cell-phone company charges its customers different amounts according to customers' usage, as shown in the following table.

| Hours of Usage, x | Total Charges (in $), y |
|---|---|
| 3 | 37 |
| 5 | 45 |
| 7 | 53 |
| 10 | 65 |

a) Determine the hourly rate the cell-phone company charges its customers. 4

Slope (m) $\frac{\Delta y}{\Delta x} = \frac{\$}{hrs}$

(3,37) (5,45)
$x_1\ y_1$ $x_2 y_2$

$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{45-37}{5-3}$ $m = \frac{8}{2}$ ; $m = 4$

$4 per hr of cell phone usage

b) Determine the cost of using the cell-phone for 0 hours. 25

fee (y-int / starting value) (b)

The company charges a $25 fee for 0 hrs of use.

(3,37) $y = mx + b$
x y $37 = (4)(3) + b$
m=4 $37 = 12 + b$
$-12\ -12$
$25 = b$

c) Write the equation for the function $y = 4x + 25$

6. The rate at which crickets chirp is a linear function of temperature. At 59°F, they chirp 76 times per minute and at 65°F, they chirp 100 times per minute.

x = Temp
y = chirps
$\frac{\Delta y}{\Delta x} = \frac{min}{Temp}$

(59,76) (65,100)

a) Write an equation in slope-intercept form that represents the function.

$y = mx + b$
$m = 4$
$b = -160$
$y = 4x - 160$

(59,76) (65,100)
$x_1\ y_1$ $x_2\ y_2$
$m = \frac{y_2 - y_1}{x_2 - x_1}$ $m = \frac{100-76}{65-59}$ $m = \frac{24}{6}$ $m = 4$

(59,76) $y = mx + b$
x y $76 = (4)(59) + b$
m=4 $76 = 236 + b$
$-236\ -236$
$-160 = b$

b) Predict the number of chirps per minute when the temperature is 72°F.

x-value

$y = 4x - 160$
$y = 4(72) - 160$
$y = 288 - 160$
$y = 128$

128 chirps

7. A catalog company charges a shipping fee of $0.25 for each pound an order weighs. A $3 handling fee is also charged. Which function represents the total fees for an order of $p$ pounds? m=0.25 b=3

a) $f(p) = 0.25 + 3p$
b) $f(p) = 0.25p + 3$
c) $f(p) = 0.25(p + 3)$
d) $f(p) = p(0.25 + 3)$

8. It costs $6 to park a car in a lot an $1.50 per hour to keep it there. Which function represents the total cost to have a car parked in this lot for $h$ hours? m=1.50 b=6

a) $f(h) = 1.5 + 6h$
b) $f(h) = 1.5h + 6$
c) $f(h) = 1.5(h + 6)$
d) $f(h) = h(1.5 + 6)$

m=0.25
b=3

m=1.50
b=6