Math 10 F&P

Chapter 5 and 6 Review

Graphing and Linear Relations

Name: *Key* ✗

Learning Goal	Novice	Apprentice	Expert
1. I will be able to explain the relationships among data and graphs			
2. I will be able to show an understanding of slope, lines, rate of change, parallel lines, perpendicular lines			
3. I will be able to restrict domain and range			

Learning Goal #1: I will be able to explain the relationships among data and graphs

1. The cost C, in dollars, of renting a hall for the prom is given by the formula $C(n) = 500 + 4n$ where n is the number of students attending the prom. Calculate the cost of renting the hall if 70 students attend.
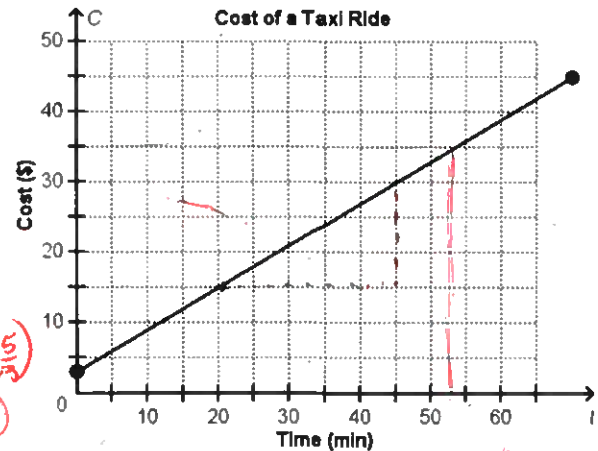
$$C(n) = 500 + 4(70)$$
$$= 500 + 280$$
$$= \$780.^{00}$$

2. If $f(x) = x^2 - x$, find the value of $f(-3)$:

$$f(-3) = (-3)^2 - (-3)$$
$$= 9 + 3 \qquad = 12$$

3. This graph shows the cost of a taxi ride. The cost, C dollars, and the time of ride, T (min)

~~a.~~ is a function of the duration of the ride, t min.

Cost of a Taxi Ride (Cost ($) vs Time (min))

b. What is the duration of the ride when the cost is $35?

- 53 min if interpolate

equation: $y = \frac{3}{5}x + 3$ $35 = \frac{3(x)}{5} + 3$ $\boxed{32 = \frac{3}{5} \times \left(\frac{5}{3}\right)}$
$\quad -3 \qquad -3 \qquad \boxed{53 = x}$

4. Which set of ordered pairs does **not** represent a function?

the $x = 2$ has
2 y values
$x = 2 \begin{array}{c} 5 \\ -1 \end{array}$

a) $\{(2,5),(3,8),(4,11),(2,-1)\}$ ← (circled)

b) $\{(4,6),(5,-7),(7,9),(8,-10)\}$ ✓

c) $\{(-3,-8),(-1,-6),(-2,5),(0,7)\}$ ✓

d) $\{(7,0),(4,-1),(-6,5),(-8,0)\}$

★ function has only **1** X value for each y.

5) Each point on this graph represents a person. Which two people are the same age?

Ages and Masses of People

- Person E + D are the same age
- Person C + D are the same mass
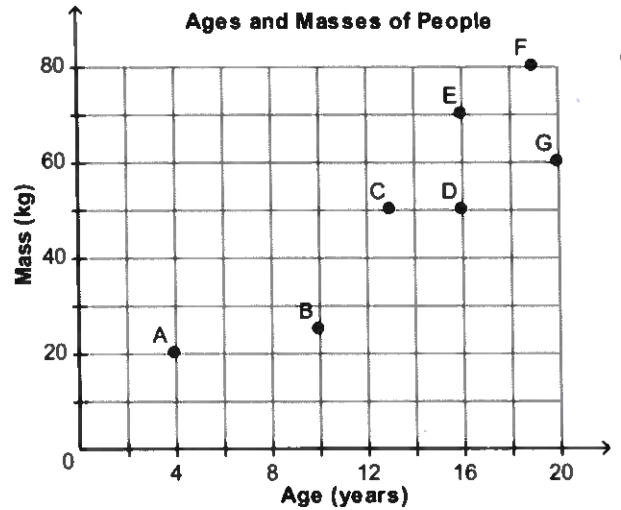
5) Joshua went on a bike ride. Write a statement that best describes what is happening for line segment DE in this graph?

Joshua's Bike Ride

Joshua leaves home and bikes quickly for the first 15 minutes. He then stops for 5 minutes 3km away from home. He then bikes slower for another 2km. He stops at 5km away for 50 minutes and then bikes very quickly home. He makes it home in 20 minutes
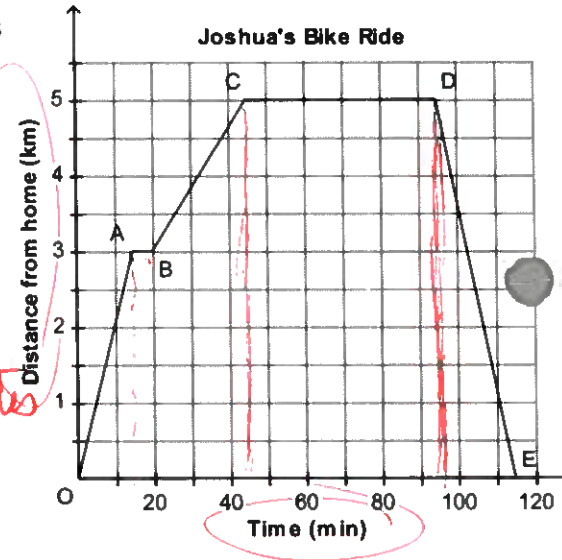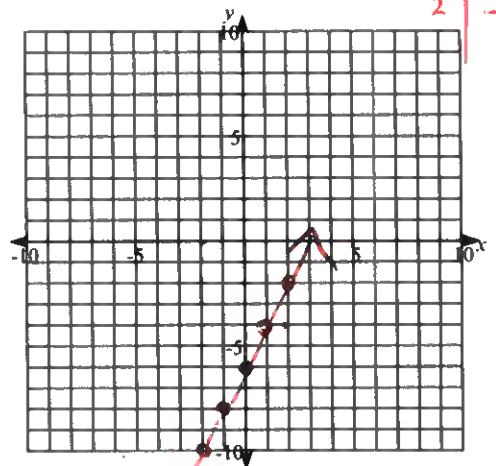
6) For each relation, create a table of values and then graph the relation.
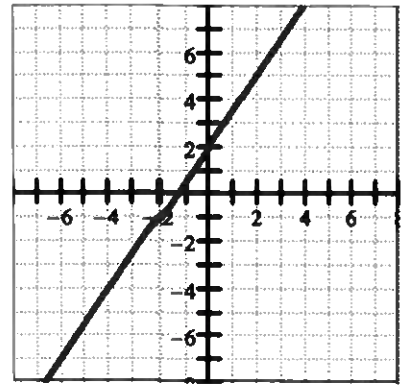
a) $y = x^2 + 2$
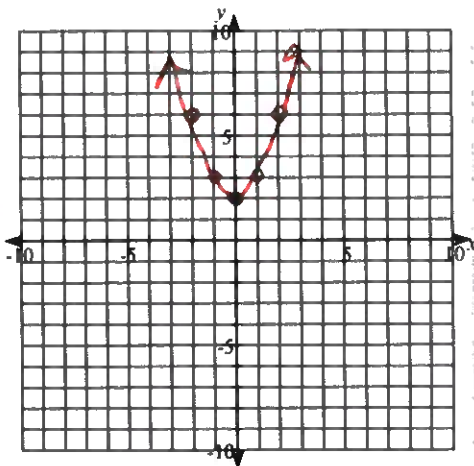
x	y
-2	6
-1	3
0	2
1	3
2	6

b) $y = 2x - 6$

x	y
-2	-10
-1	-8
0	-6
1	-4
2	-2

Learning Goal #2: I will be able to show an understanding of slope, lines, rate of change, parallel lines, perpendicular lines

1) What equation best represents the line on the graph?

A. $y = \frac{3}{2}x + 2$
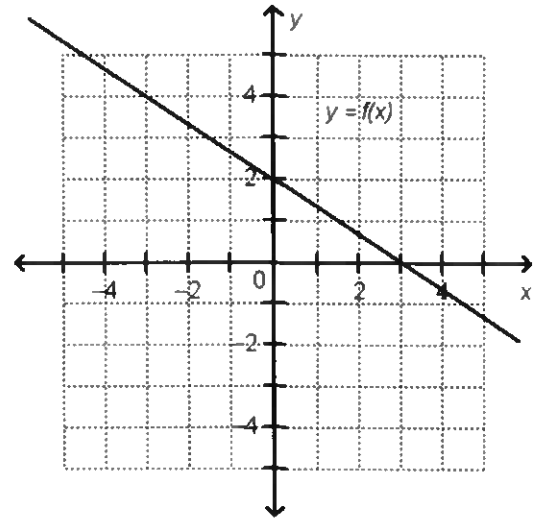
B. $y = -\frac{3}{2}x + 2$ ← must be a +ve slope.

C. $y = -\frac{2}{3}x + 2$ ←

D. $y = \frac{2}{3}x - 1$

↑ y intercept must be 2.

2) Determine the vertical and horizontal intercepts of this graph.

Vertical intercept(s) $y = 2$
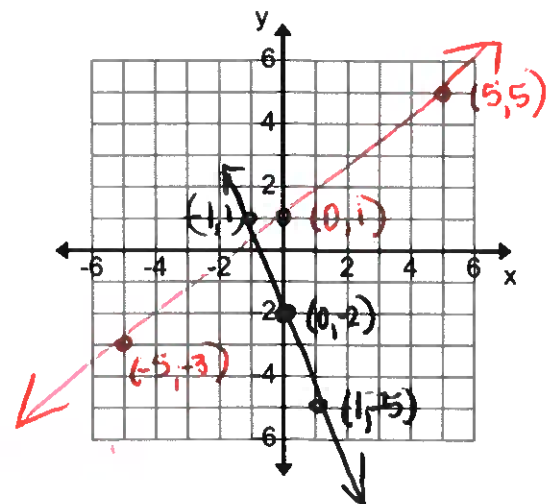(y intercept)

Horizontal intercept(s) $X = 3$
(x intercept)

3) Graph and label the ~~four~~ two linear relations on the axes provided. State the slope of each line and the y-intercept.

Line a) $y = \frac{4}{5}x + 1$

Slope = $\frac{4}{5}$ y-intercept = 1
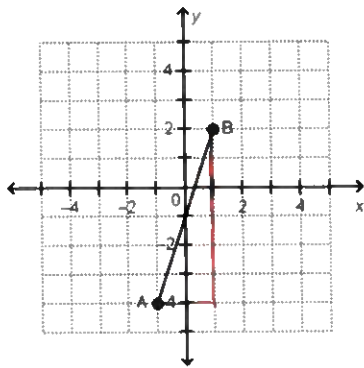
Line b) $y = -3x - 2$

Slope = -3 y-intercept = -2

4) Calculate the **slope** of the line containing the following points.

a) (3, 8) & (5, 3)	b) (-4, 4) & (-7, 4)	c) (-2, 4) & (-2, 8)
$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ $m = \dfrac{3-8}{5-3}$ $= \dfrac{-5}{2} = \boxed{-2\frac{1}{2}}$	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ $m = \dfrac{4-4}{-7+(+4)}$ $= \dfrac{0}{-3}$ $= 0$ ★ horizontal line	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ $m = \dfrac{8-4}{-2+(-2)}$ $= \dfrac{8-4}{0}$ ★ undefined ★ vertical line

5) Determine the slope of the line that is **perpendicular** to this line segment.

$m = \dfrac{rise}{run}$

$= \dfrac{6}{2}$

$= 3$

$m \perp$ $m = \boxed{\dfrac{-1}{3}}$

★ inverse + opposite

6) A line has x-intercept −5 and y-intercept 1. Determine the <u>slope</u> of a line <u>parallel</u> to this line.

$(-5, 0)$ ⊤ $(0, 1)$

$m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{1-0}{0-(-5)} = \dfrac{1}{5}$

$\boxed{m = \dfrac{1}{5}}$ ★ same slope

7) Students at a Secondary School sell punch during the school carnival.

- The number of cups sold, n, is a linear function of the temperature in degrees Celsius, t.
- The students sold 450 cups when the temperature was 25°C.
- They sold 550 cups when the temperature was 29°C.

indep. t	dep. n
25	450
29	550

a) Write an equation in **slope-point form** to represent this function.

★ $y - 450 = 25(x - 25)$

or

★ $y - 550 = 25(x - 29)$

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

$= \dfrac{550 - 450}{29 - 25} = \dfrac{100}{4} = 25$

b) Determine the approximate temperature when the students sell 325 cups of punch.

$y - 450 = 25(x - 25)$

$y - 450 = 25x - 625$

$+450 \qquad\qquad +450$
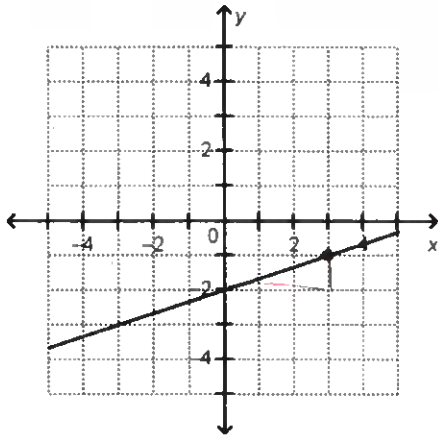
$y = 25x - 175$

$y = 25x - 175$

$325 = 25x - 175$

$+175 \qquad\quad +175$

$\dfrac{500}{25} = \dfrac{25x}{25}$ $\boxed{x = 20°C}$

8). Write an __equation__ to describe the graph below.

Handwritten work:
$$y = \frac{1}{3}x - 2 \,_{+2}$$
$$+\frac{1}{3}x$$
$$^{-3}\left(\frac{1}{3}x + y + 2 = 0\right)$$
$$x - 3y - 6 = 0$$

Slope-point form: $y + 1 = \frac{1}{3}(x - 3)$

Slope-intercept form: $y = \frac{1}{3}x - 2$

General form: $x - 3y - 6 = 0$

9) Write the equation of the line in slope-point form and general form using the information given.

a. A line that passes through (15, -7) with a slope of $\frac{2}{3}$.

$$y + 7 = \frac{2}{3}(x - 15)$$
$$y + 7 = \frac{2}{3}x - \frac{30}{3}$$
$$\begin{array}{c} y + 7 = \frac{2}{3}x - 10 \\ -7 \qquad \quad -7 \end{array}$$
$$y = \frac{2}{3}x - 17 \rightarrow^{-3}\left(-\frac{2}{3}x + y + 17 = 0\right)$$

Slope-point form $y + 7 = \frac{2}{3}(x - 15)$

General form $2x +$

b. A line that passes through (6, 8) and perpendicular to $y = -3x - 7$

$$m_\perp = \frac{1}{3}$$

$$y - 8 = \frac{1}{3}(x - 6)$$
$$y - 8 = \frac{1}{3}x - \frac{6}{3}$$
$$\begin{array}{c} y - 8 = \frac{1}{3}x - 2 \\ +8 \qquad \quad +8 \end{array}$$
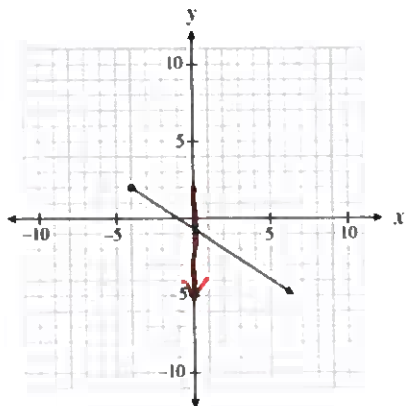
Slope-point form $y - 8 = \frac{1}{3}(x - 6)$

Slope-intercept form $y = \frac{1}{3}x + 6$

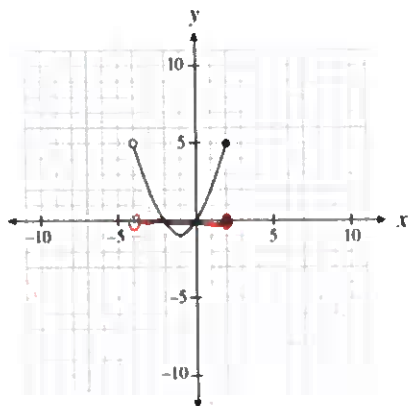# Learning Goal #3: I will be able to restrict domain and range

1) Determine the range of the graph below. State in BOTH interval and set form.

$R: [2, \infty)$

$\left\{ y \mid -\infty < y \le 2, \, y \in \mathbb{R} \right\}$

2) Determine the domain of the graph below. State in BOTH interval and set form.

$D: (-4, 2]$

$\left\{ x \mid -4 < x \le 2, \, x \in \mathbb{R} \right\}$

3) Determine the domain and range of this graph. State in BOTH interval and set form.

$D: [-1, 3)$

$R: (-4, 0]$

$\left\{ x \mid -1 \le x < 3, \, x \in \mathbb{R} \right\}$

$\left\{ y \mid -4 < y \le 0, \, y \in \mathbb{R} \right\}$