

Review: Linear Concepts

Name: _____

Accelerated 7th Grade Math

Directions...

- Read each question carefully.
- Show all work for full credit.

1. What does the word *slope* mean and what *formula* do you use to find it?

Slope means "steepness".

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

2. Find the slope for each of the following.

a. $y = 2x - 7$

2

b. $y = -\frac{2}{3}x - 6$

$-\frac{2}{3}$

c.

x	y
2	4
4	2
6	0
8	-2

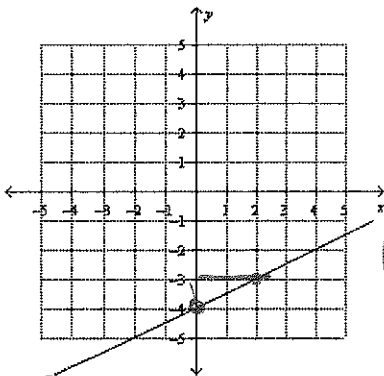
$-\frac{2}{2} = -1$

d.

x	y
-12	10
-9	1
-6	-8
-3	-17

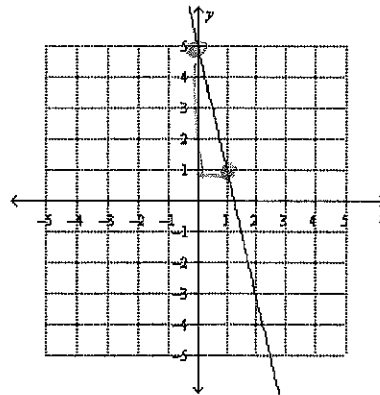
$-\frac{9}{3} = -3$

e.



$\frac{1}{2}$

f.



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

g. (2, -1) (8, 4)

$\frac{4 - (-1)}{8 - 2} = \frac{5}{6}$

h. (4, 10) (10, 12)

$\frac{12 - 10}{10 - 4} = \frac{2}{6} = \frac{1}{3}$

i. (-6, -4) (6, 1)

$\frac{1 - (-4)}{6 - (-6)} = \frac{5}{12}$

3. What is the general form of a **linear equation** and what does the m and the b stand for?

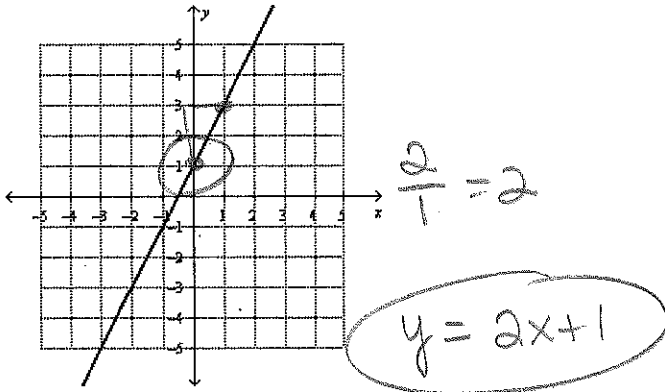
$y = mx + b$

 $m \rightarrow$ slope

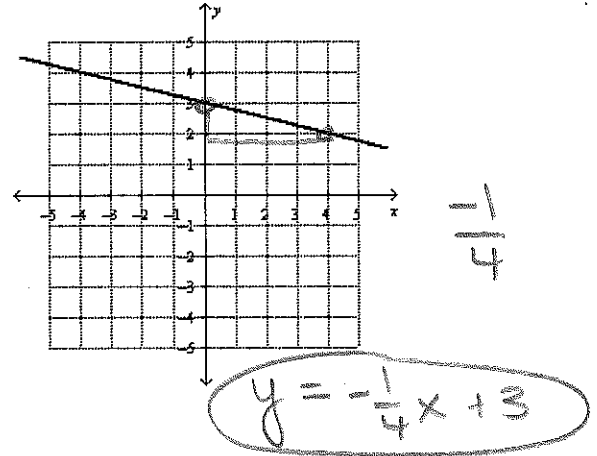
 $b \rightarrow$ y-intercept

4. Write a linear equation for each of the following...

a.



b.



5. For each of the following, find the slope and y-intercept, then write an equation.

a.

x	y
-3	12
0	24
3	36
6	48
9	60

3 < > 12

slope = $\frac{12}{3} = 4$

 y-intercept = $(0, 24)$

 equation:

$y = 4x + 24$

b.

x	y
0	24
2	16
4	8
6	0
8	-8
10	-16

slope = $\frac{-8}{2} = -4$

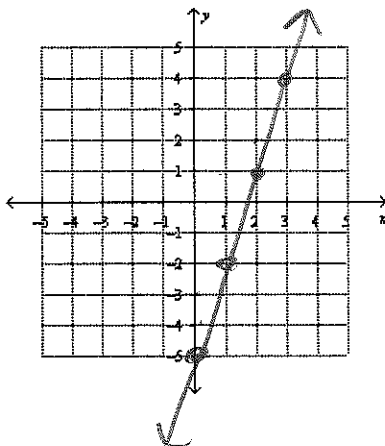
 y-intercept = $(0, 24)$

 equation:

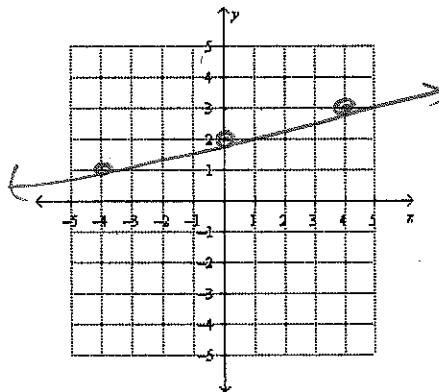
$y = -4x + 24$

6. Graph each of the following lines...

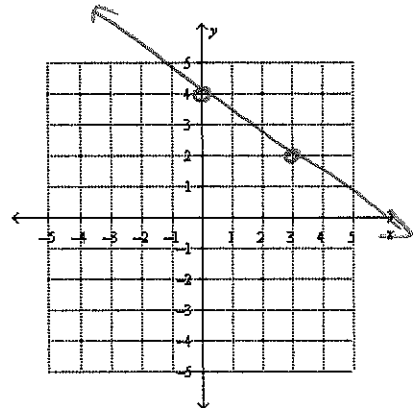
a. $y = 3x - 5$



b. $y = \frac{1}{4}x + 2$



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



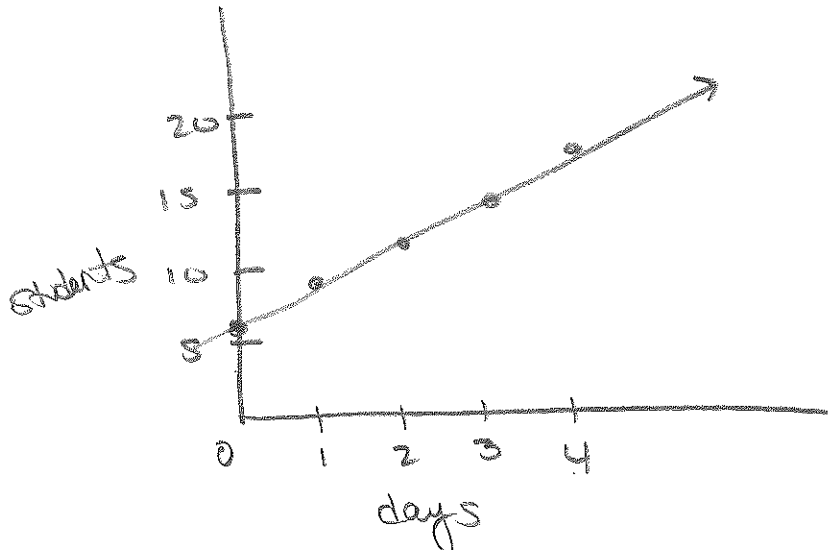
7. The golf club is looking for new members. There are currently 6 students in the club, but every day three more people sign up.

a. Identify the input and the output for the situation and create a table.

Input: # of days Output: # of students

Input: <u>days</u>	0	1	2	3	4
Output: <u>students</u>	6	9	12	15	18

b. Draw a graph of the situation. Be sure to label each axis.



c. Write a linear equation that represents the situation.

$y = 3x + 6$

d. **Use the equation** you wrote in part c to answer each of the following...

i. How many students are in the club after 14 days?

$$3(14) + 6$$

$$42 + 6$$

48 students

ii. If there are 27 people in the club, how many days have gone by?

$$27 = 3x + 6$$

$$\underline{-6} \quad \underline{-6}$$

$$21 = 3x$$

7 days = x

e. What is the *slope* of this situation? What is the *y-intercept* of this situation?

Slope = 3

y-intercept is (0, 6)

8. Write the equation for the line that goes through each pair of points listed below...

a. (9, 10) and (3, -2)

$$\frac{-2-10}{3-9} = \frac{-12}{-6} = 2$$

$$-2 = 2(3) + b$$

$$-2 = 6 + b$$

$$-6 \quad -6$$

$$-8 = b$$

$$y = 2x - 8$$

b. (-1, -5) and (6, -10)

$$\frac{-10-5}{6-(-1)} = \frac{-15}{7}$$

$$-10 = \frac{-5}{7}(6) + b$$

$$-10 = \frac{-30}{7} + b$$

$$-10 = -4\frac{2}{7} + b$$

$$-5\frac{5}{7} = b$$

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

9. Two men are climbing a mountain.

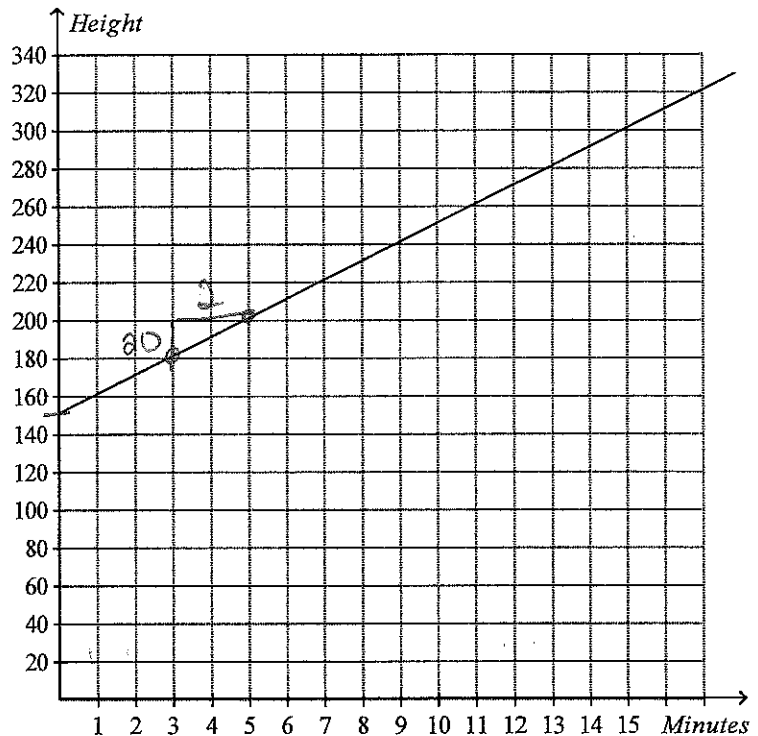
Ted:

Minutes	Height (ft)
0	200
5	240
10	280
15	320

$$\frac{40}{5} = 8$$

5 < 40

Ross:



a. Who is climbing faster?

$$\frac{80}{2} = 10$$

Ross 10 ft/min

b. Who starts out higher on the mountain?

Ted starts at 200 ft.

c. Write an equation for each climber.

i. Ted: $y = 8x + 200$

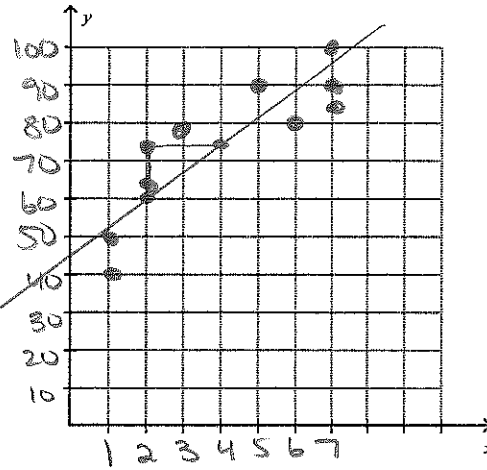
ii. Ross: $y = 10x + 150$

10. The data shows the comparison of the number of hours spent studying compared to recent test scores.

a. Plot the data from the table. Make sure that you label the x-axis and the y-axis.

Hours	Recent Score
3	80
5	90
2	75
6	80
7	90
1	50
2	65
7	85
1	40
7	100

Label:
score



Label: hours

b. Draw a trend line that best fits the scatter plot.

c. Write an equation for the line of best fit in Slope-Intercept form ($y = mx + b$). Show your work for full credit.

$$\frac{14}{2} = 7$$

$$60 = 7(2) + b$$

$$60 = 14 + b$$

$$-14 \quad -14$$

$$46 = b$$

$$y = 7x + 46$$

d. In the equation you wrote in #3, the slope, or $m = \underline{7}$.
In the context of the studying/test score situation, this means that...

Test scores will improve 7 points for every 1 hour of studying.

e. In the equation you wrote in #3, the y-intercept, or $b = \underline{46}$.
In the context of the studying/test score situation, this means that...

If someone studies 0 hours they will earn a score of 46.

- f. If a student earned a score of 72, how many hours did that student study? Use your equation and show your work for full credit.

$$72 = 7x + 46$$

$$\frac{26}{7} = \frac{7x}{7}$$

$$x = 3\frac{5}{7} \text{ hours}$$

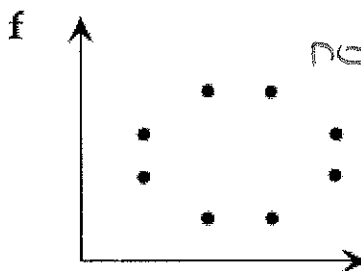
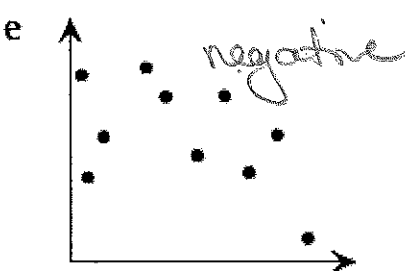
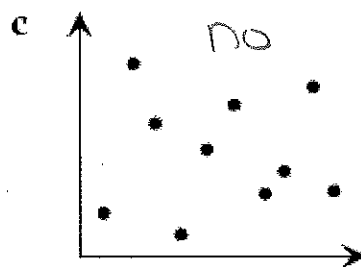
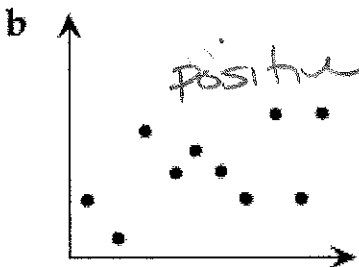
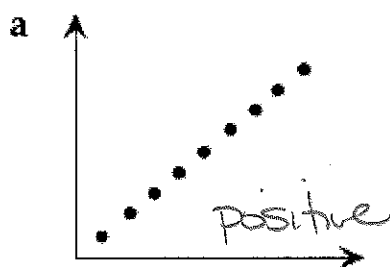
- g. If a student studies for four hours, what score will they earn? Use your equation and show your work for full credit.

$$y = 7(4) + 46$$

$$y = 28 + 46$$

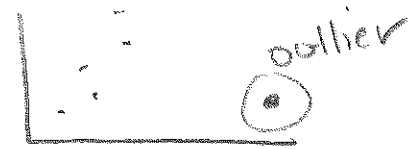
$$y = 74 \text{ points}$$

11. For a-f, identify if the scatter plot has a positive association, negative association, or no association.



12. What is an outlier? Include a sketch of a graph to help illustrate your explanation.

An outlier is a data point that doesn't fit with the rest of the data.



Answers:

- 2) a. 2
b. -2/3
c. -1
d. -3
e. 1/2
f. -4
g. 5/6
h. 1/3
i. 5/12

- 4) a. $y = 2x + 1$
b. $y = -1/4 x + 3$
5) a. $y = 4x + 24$
b. $y = -4x + 24$
7) c. $y = 3x + 6$
d. i. 48 students
d. ii. 7 days
e. $m = 3, b = 6$
8) a. $y = 2x - 8$

- 9) a. Ross: 10 ft/min
b. Ted: 200 ft
c. i. $y = 8x + 200$
c. ii. $Y = 10x + 150$
10) See website - answers can vary