

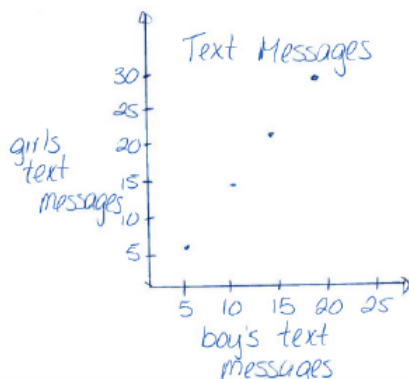
## Mid Module 1 Study Guide Answer Key

1. Josiah and Tillery have new jobs at Yum Yum's Ice Cream Parlor. Josiah is Tillery's manager. In their first year, Josiah will be paid \$14 per hour, and Tillery will be paid \$7 per hour. They have been told that after every year with the company, they will each be given a raise of \$2 per hour. Is the relationship between Josiah's pay and Tillery's pay rate proportional? Explain your reasoning using a table.

Year	J	T
1	14	7
2	16	9
3	18	11
4	20	13
5	22	15

No, the relationship between Josiah's pay rate and Tillery's pay rate is not proportional because the constant of proportionality changes for each pair of numbers.

2. A recent study claimed in any given month, for every 5 text messages a boy sent or received, a girl sent or received 7 text messages. Is the relationship between the number of text messages sent or received by boys proportional to the number of text messages sent or received by girls? Explain your reasoning using a graph on the coordinate plane.



Yes, the number of text messages sent or received by boys is proportional to the number of text messages sent or received by girls because the pairs of values make a graph that forms a straight line through the origin.

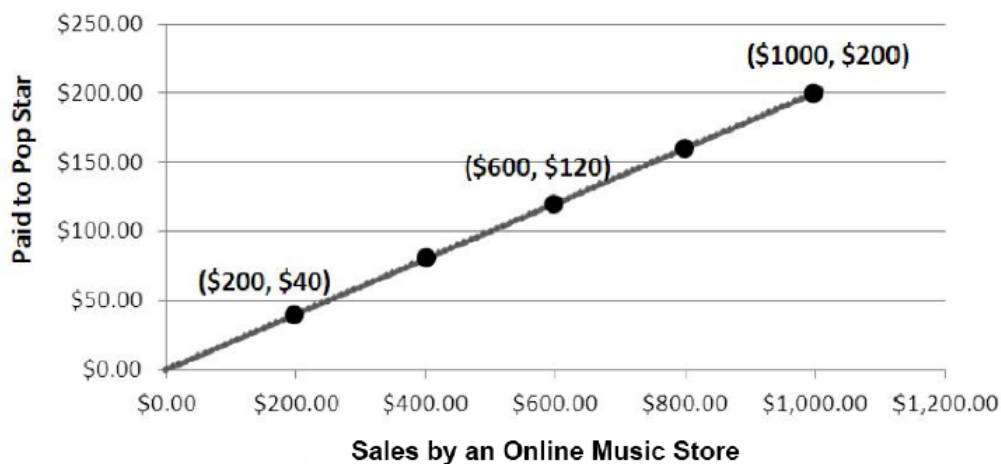
It does not matter which quantity is on each axis (you may have plotted boys on the y-axis and girls on the x-axis, for example).

Also recommend using a different scale for the girl's text messages that better aligns to the girls' quantities (multiples of 7).



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3. When a song is sold by an online music store, the store takes some of the money, and the singer gets the rest. The graph below shows how much money a pop singer makes given the total amount of money brought in by one popular online music store from sales of the song.



- a. Identify the constant of the proportionality between dollars earned by the pop singers and dollars brought in by sales of the song.

$$K = y/x$$

$$\frac{40}{200} = k$$
$$\frac{1}{5} = k$$

You may write answer as a fraction or decimal (0.2)

- b. Write an equation relating dollars earned by the pop singers,  $y$ , to dollars brought in by the sales of the song,  $x$ .

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

$$\text{OR } y = 0.2x$$

The other formats of the equation,  $y = kx$  are also acceptable ( $x = y/0.2$  OR  $0.2 = y/x$ )

as long as you have the correct equation and the correct value of  $k$



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- c. According to the proportional relationship, how much money did the song bring in from sales in the first week if the pop star earned \$800 that week?

$$\begin{array}{l} 800 = \frac{1}{5}x \\ \times \frac{5}{1} \quad \times \frac{5}{1} \\ \hline 800 \times \frac{5}{1} = x \\ 4,000 = x \end{array}$$

The sales for that week were \$4,000

You may use any format of the equation,  $y = kx$ . I recommend using the one that is solved for  $x$ :

$$x = y/k$$

You must write your equation for full credit.

- d. Describe what the point  $(0,0)$  on the graph represents in terms of the situation being described by the graph.

When the sales of the song brings in zero dollars,  
then the singer earns zero dollars.

- e. Which point on the graph represents the amount of money the pop singer gets for \$1 in money brought in from sales of the song by the store?

$$(1, \frac{1}{5})$$

$x$  is given in the problem and you know  $k$ ,  
therefore you must solve for  $y$ .

$$Y = (1/5)(1) = 1/5$$

You may also write  $(1, 0.2)$  as your answer.

**Make sure you show your work!**