Lesson 5: Identifying Proportional and Non-Proportional Relationships in Graphs

Classwork

Opening Exercise

Isaiah sold candy bars to help raise money for his scouting troop. The table shows the amount of candy he sold compared to the money he received.

x Candy Bars Sold	y Money Received ($)
2	3
4	5
8	9
12	12

Is the amount of candy bars sold proportional to the money Isaiah received? How do you know?

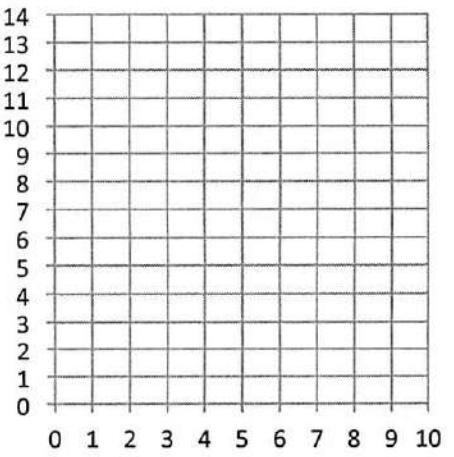
_____

_____

Example 1: From a Table to Graph

Using the ratio provided, create a table that shows money received is proportional to the number of candy bars sold. Plot the points in your table on the grid.

x Candy Bars Sold	y Money Received ($)
2	3



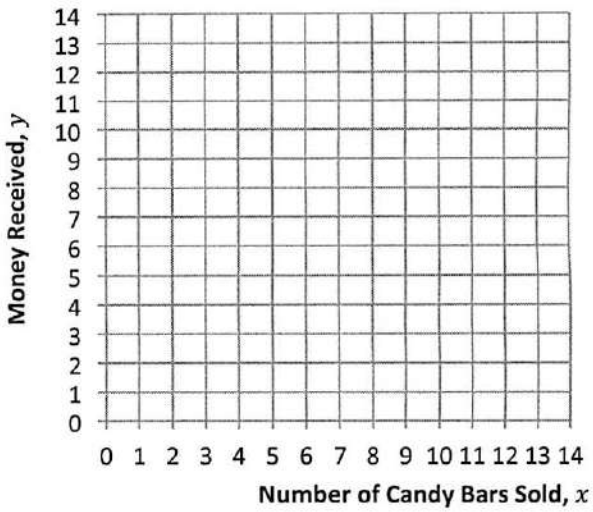
Important Note:

Characteristics of graphs of proportional relationships:

Example 2

Graph the points from the Opening Exercise.

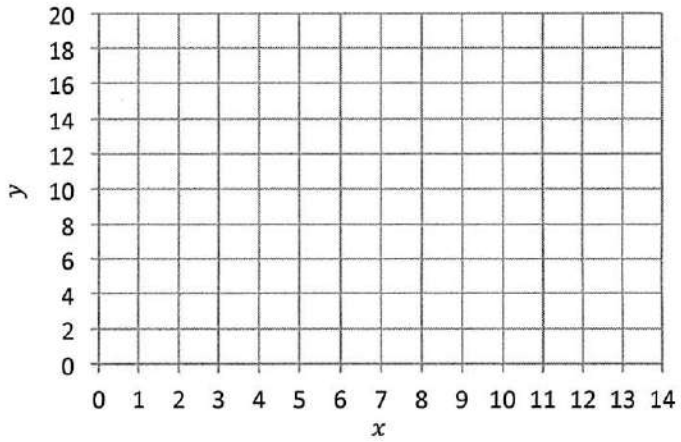
x Candy Bars Sold	y Money Received ($)
2	3
4	6
8	12
12	14



Example 3

Graph the points provided in the table below and describe the similarities and differences when comparing your graph to the graph in Example 1.

x	y
0	6
3	9
6	12
9	15
12	18

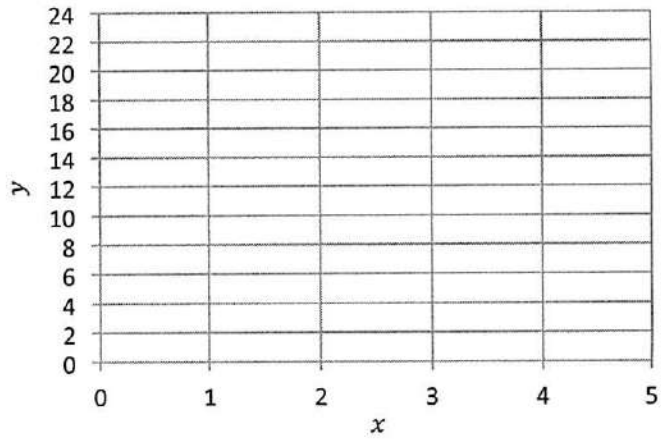


Similarities with Example 1:

Differences from Example 1:

2. Create a table and a graph for the ratios 2: 22, 3 to 15, and 1: 11. Does the graph show that the two quantities are proportional to each other? Explain why or why not.

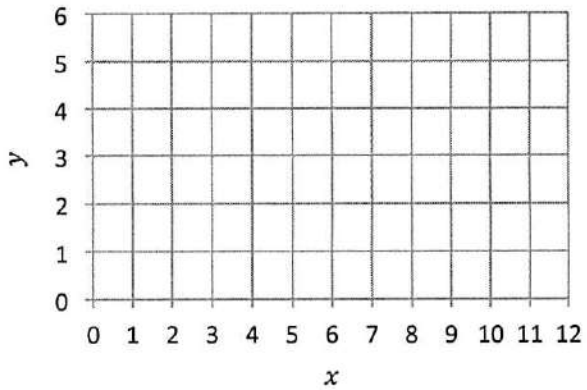
x	y



3. Graph the following tables and identify if the two quantities are proportional to each other on the graph. Explain why or why not.

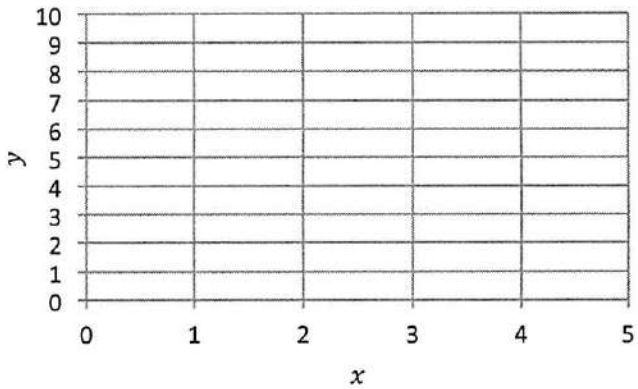
a.

x	y
3	1
6	2
9	3
12	4



b.

x	y
1	4
2	5
3	6
4	7



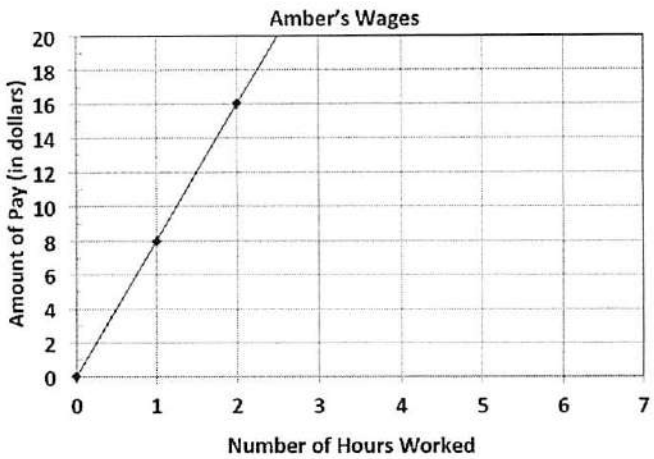
Name _____ Date_____

Lesson 8: Representing Proportional Relationships with Equations

Exit Ticket

John and Amber work at an ice cream shop. The hours worked and wages earned are given for each person.

John's Wages	
Time (in hours)	Wages (in dollars)
2	18
3	27
4	36



1. Determine if John's wages are proportional to time. If they are, determine the unit rate of $\frac{y}{x}$. If not, explain why they are not.

2. Determine if Amber's wages are proportional to time. If they are, determine the unit rate of $\frac{y}{x}$. If not, explain why they are not.

3. Write an equation for both John and Amber that models the relationship between their wage and the time they worked. Identify the constant of proportionality for each. Explain what it means in the context of the situation.

4. How much would each worker make after working 10 hours? Who will earn more money?

5. How long will it take each worker to earn $50?

Lesson Summary

If a proportional relationship is described by the set of ordered pairs that satisfies the equation $y = kx$, where k is a positive constant, then k is called the **constant of proportionality**. The constant of proportionality expresses the multiplicative relationship between each x-value and its corresponding y-value.

Problem Set

Write an equation that will model the proportional relationship given in each real-world situation.

1. There are 3 cans that store 9 tennis balls. Consider the number of balls per can.
   a. Find the constant of proportionality for this situation.
   b. Write an equation to represent the relationship.

2. In 25 minutes Li can run 10 laps around the track. Determine the number of laps she can run per minute.
   a. Find the constant of proportionality in this situation.
   b. Write an equation to represent the relationship.

3. Jennifer is shopping with her mother. They pay $2 per pound for tomatoes at the vegetable stand.
   a. Find the constant of proportionality in this situation.
   b. Write an equation to represent the relationship.

4. It costs $15 to send 3 packages through a certain shipping company. Consider the number of packages per dollar.
   a. Find the constant of proportionality for this situation.
   b. Write an equation to represent the relationship.

5. On average, Susan downloads 60 songs per month. An online music vendor sells package prices for songs that can be downloaded on to personal digital devices. The graph below shows the package prices for the most popular promotions. Susan wants to know if she should buy her music from this company or pay a flat fee of $58.00 per month offered by another company. Which is the better buy?
   a. Find the constant of proportionality for this situation.
   b. Write an equation to represent the relationship.
   c. Use your equation to find the answer to Susan's question above. Justify your answer with mathematical evidence and a written explanation.