

1-25-18

Aim: SWBAT determine if a relationship is proportional.

HW: Packet Page 17

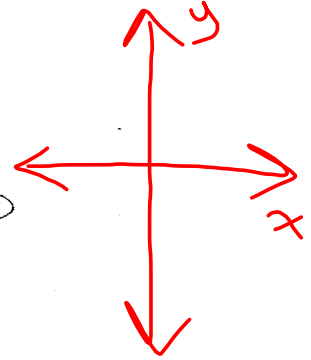
Quiz Monday or Tuesday

Do Now: Check hw

Homework - Independent & Dependent Variables

Circle your answer.

- | | | |
|--|------------------|------------------|
| 1) Which is the independent variable | a) <u>x</u> | b) y |
| 2) Which is the dependent variable | a) x | b) <u>y</u> |
| 3) Which axis is the horizontal axis? | a) <u>x-axis</u> | b) y-axis |
| 4) Which axis is the vertical axis? | a) x-axis | b) <u>y-axis</u> |
| 5) Which axis is the independent axis? | a) <u>x-axis</u> | b) y-axis |
| 6) Which axis is the dependent axis? | a) x-axis | b) <u>y-axis</u> |



Based on the situation given, determine the independent and dependent variables. Remember, the dependent variable **DEPENDS** on the independent variable.

- 7) You drive at a rate of 40 miles per hour for
- t
- hours.

The independent variable is # of hoursThe dependent variable is # of miles

- 8) You burn 14 calories every minute you exercise.

The independent variable is # of minutesThe dependent variable is # of calories

- 9) Concert tickets cost \$45 per ticket.

The independent variable is # of ticketsThe dependent variable is # of \$

- 10) You earn \$12 per hour babysitting

The independent variable is # of hoursThe dependent variable is # of \$

Aim: SWBAT determine if a relationship is proportional.

What is a Proportional Relationship?

Suppose you and some friends plan to go to a movie where tickets cost \$8 each.

You will pay \$8 for 1 ticket, \$16 for 2 tickets, \$24 for 3 tickets, \$32 for 4 tickets, and so on. The ratios of the total cost of the tickets to the number of tickets are all equivalent.

A group of ratios that are equivalent are in a **proportional relationship**. When ratios are equivalent they all have **the same unit rate**. In a proportional relationship, the unit rate is called the **constant of proportionality**.

You can use a table to tell if a relationship is proportional.

Example 1) The table below shows the total cost of movie tickets based on the number of tickets you buy.

y-axis dependent	Total Cost of Tickets (\$)	8	16	24	32
x-axis independent	Number of Tickets	1	2	3	4

All the ratios of the total cost of tickets to the number of tickets are equivalent. The ratios all simplify to $\frac{8}{1}$ or 8, so the ratios are in a proportional relationship.

$$\frac{8}{1} = 8 \quad \frac{16}{2} = 8 \quad \frac{24}{3} = 8 \quad \frac{32}{4} = 8$$

The unit rate is 8 dollars per ticket, so the constant of proportionality is 8. This equation $c = 8t$, where c is the total cost and t is the number of tickets, represents this relationship. The total cost is always 8 times the number of tickets.

Let's look at another table . . .

Example 2) The table below shows the cost to play in the town soccer tournament.

Total Cost (\$)	7	8	9	10
Number of Family Members	1	2	3	4

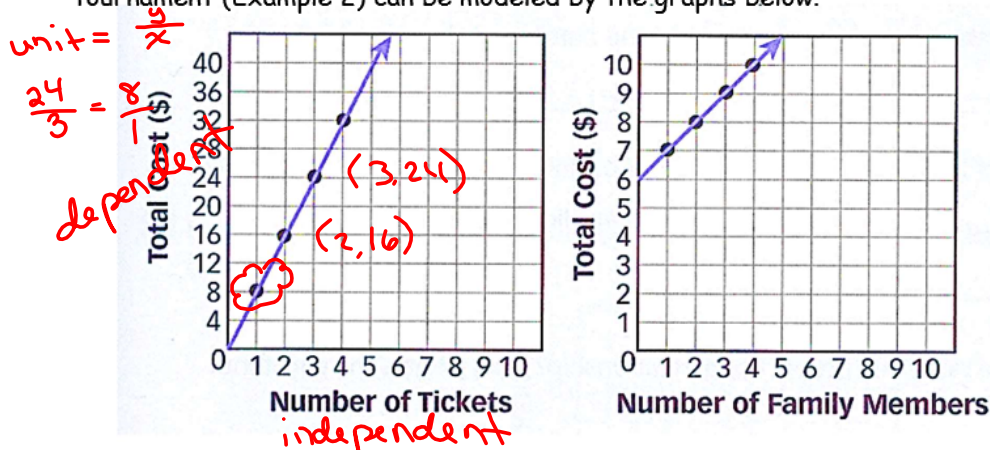
We can find and simplify the ratios of the total cost to the number of family members.

$$\frac{7}{1} = 7 \quad \frac{8}{2} = 4 \quad \frac{9}{3} = 3 \quad \frac{10}{4} = 2\frac{1}{2}$$

The ratios are **NOT** equivalent, so the quantities are **NOT** in a proportional relationship.

You can also use a graph to tell if a relationship is proportional.

The data for the cost of movie tickets (Example 1) and the cost to participate in the soccer tournament (Example 2) can be modeled by the graphs below.



The points on the graphs are on a straight line for both sets of data, but only the data for the cost of the movie tickets goes through the origin. This means that only the total cost of the movie tickets compared to the number of tickets is a proportional relationship.

Proportional Relationship	Non- Proportional Relationship
<ul style="list-style-type: none"> The graph can be represented by a straight line. The line goes through the origin (0,0) 	<ul style="list-style-type: none"> The graph may or may not be represented by a straight line. IF the graph is a line, it does not go through the origin. (0,0)

Practice Problems. Decide each situation is **Proportional Reasoning** or **Non-Proportional Reasoning**.

- | | | |
|--|--------------|------------------|
| 1) If one girl can walk to school in 10 minutes, two girls can walk to school in 20 minutes. | Proportional | Non-Proportional |
| 2) If one box of cereal costs \$2.80, two boxes of cereal cost \$5.60. | Proportional | Non-Proportional |
| 3) If one boy makes one model car in 2 hours, then he can make three of the same model in 6 hours. | Proportional | Non-Proportional |
| 4) If Huck can paint the fence in 2 days, then Huck, Tom and a third boy can paint the same fence in 6 days. | Proportional | Non-Proportional |
| 5) If one girl has 2 cats then 4 girls have 8 cats. | Proportional | Non-Proportional |

You Try #'s 1 - 3: Does the table below show a proportional or non-proportional relationship?

1)

Total Cost (\$)	3	6	9	15
Number of Ice Cream Cones	1	2	3	5

2)

Total Time (minutes)	8	18	39	78
Number of Miles	1	2	3	4

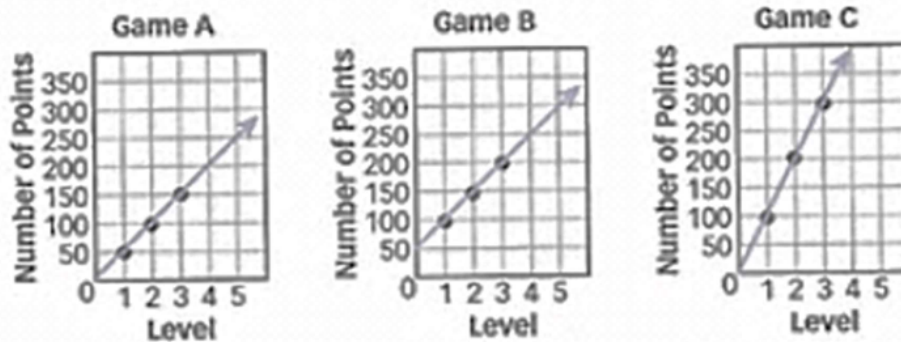
3) The following table shows a proportional relationship between total cost and number of DVD's purchased.

Number of DVD's purchased	1	3	4	6	8	
Total Cost (\$)	18	54	72	108		216

A) Use the information in the table to fill in the missing values in the table above.

B) What is the constant of proportionality? _____

4) The graphs below show the number of points you earn in each level of a game.



a) Which games, if any, have a proportional relationship between the number of points you earn and the level of the game?

b) In which game can you earn the most points in level 2? Explain your answer.
