Direct Variation: $y = kx$; $k = \frac{y}{x}$ | Inverse Variation: $k = yx$; $y = \frac{k}{x}$

k: constant

To solve: $\frac{y}{x} = \frac{y}{x}$ | To solve: $yx = yx$

x	y
1	3
2	6
3	9

Solving Equations II SEII 11

Inverse Variation

Activity/Notes

Name _____

Date _____ Period _____

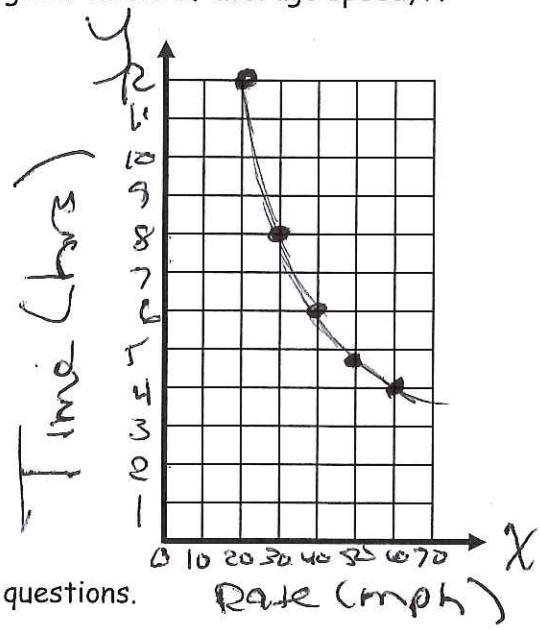
Road Trip

You are planning a trip with your family that will require you to drive 240 miles. The time it takes to complete the trip will vary according to your average speed. You may recall the equation distance = rate • time. Solving the equation $d = rt$ for t, yields the equation $t = \frac{d}{r}$. Use this equation to complete the table of values below using the given values of average speed, r.

$d = rt$

$t = \frac{240}{20}$ $t = \frac{240}{30}$ $t = \frac{240}{40}$ $t = \frac{240}{50}$ $t = \frac{240}{60}$

Rate (in miles per hour)	Time (in hours)
20	12
30	8
40	6
50	4.8
60	4



Use the information in the table to answer the following questions.

1. As the rates increase, what do you notice about the times for your trip?

As the rates increase, the time decreases

2. Notice that the rates increase at a constant rate. What do you notice about the rate of change of the times?

It is not a constant rate of change.

3. Graph the data points on the graph. What do you notice about the graph? How does this relate to your answer in #2?

It curves because it's not decreasing at a constant rate. (so it's not linear - straight line)

The relation you explored in the road trip problem is known as **inverse variation**. We say that "y varies inversely as x".

- Inverse variation is described by an equation $xy = k$ $(k \neq 0)$ or $y = \frac{k}{x}$.

What is the relationship between x and y in inverse variation?

As one increases, the other decreases

When multiplied (xy), the product is the same (a constant)

What can you say about the graph of an inverse variation?

It decreases not at a constant rate so it curves