

Do I Have to Mow the Whole Thing?

NAME _____

DATE _____



Imagine you've been asked to mow a rectangular garden that is 24 square yards. In your mind, you probably have an idea of the dimensions of the garden from this description.

1. Sketch a rectangle whose area is 24 square units and label its dimensions:

Length: 6
Width: 4

2. Sketch another rectangle with the same area but different dimensions:

Length: 12
Width: 2

3. Find more combinations of lengths and widths that will generate a rectangle with an area of 24 square units.

LENGTH	6	12	5					1.5		0.5		120		0.3
WIDTH	4	2	4.8						1.5		0.5		120	

4. Graph the data points from the table above, using *length* for your x-values and *width* for your y-values. (It's reasonable not to graph *all* the points that you've found.)

5. If you were to connect the points, how would you describe the graph of the function?

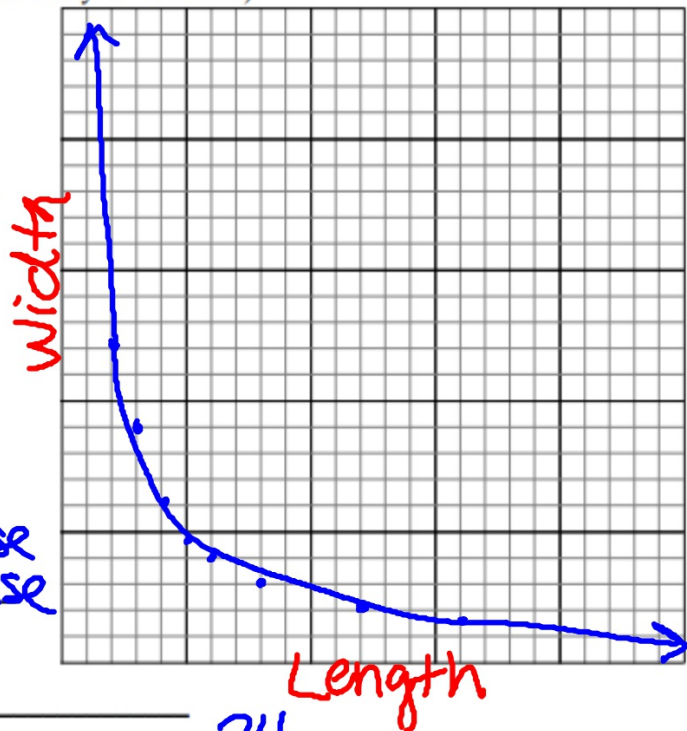
Decreasing; never touches x or y-axis

6. What rule describes the relationship between the length and the width?

{Inverse}

7. Fill in the blanks in the sentences below:

As the length increases, the width Decrease
As the length Decrease the width Increase



8. What equation represents this relationship? _____

If you haven't already done so, solve this equation for y: $y = \frac{24}{x}$



Professor Jenkins has finished a manuscript that he's written by hand. It will take four typists nine days to type the entire manuscript.

9. How many days of typing will it take if only two typists are available to type the manuscript?

~~$\frac{4}{9} = \frac{2}{x}$~~ $4x = 18$ $x = \frac{18}{4} = \left(\frac{9}{2}\right)$

10. How many days will it take one typist to type the manuscript?

$\frac{4}{9} = \frac{1}{x}$ $4x = 9$ $x = \frac{9}{4}$ days

11. How many typists are needed if he needs the manuscript in three days?

$\frac{4}{9} = \frac{y}{3}$ $12 = 9y$ $y = \frac{12}{9} = \left(\frac{4}{3}\right)$

12. Fill in the table with as many typist-days pairs that you can find.

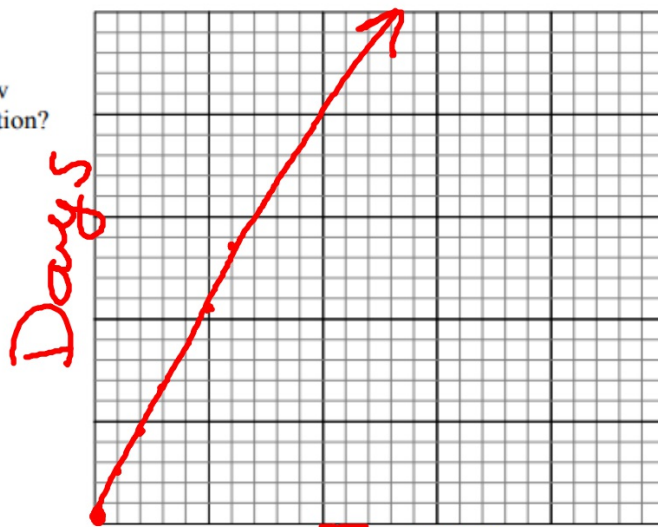
TYPISTS	4	2	1											
DAYS	9			3										

$\frac{4}{9} = \frac{0}{x}$

13. Graph the data points from the table above, using *typist* for your *x*-values and *days* for your *y*-values. (It's reasonable not to graph *all* the points that you've found.)

14. If you were to connect the points, how would you describe the graph of the function?

Increases
Always Positive
line!
{Direct}



15. Fill in the blanks in the sentences below:

As the number of typists increases, the number of days increases
As the number of days Decreases, the number of typists Decreases

16. What equation represents this relationship? $y = \frac{4}{9}x$
If you haven't already done so, solve this equation for *y*: $y = \frac{4}{9}x$

Solve the following:

1. On a map, distance in km and distance in cm varies directly and 25 km are represented by 2 cm. If two cities are 7 cm apart on the map, what is the actual distance between them?

① $y = mx$ ② $\frac{25}{2} = \frac{m(2)}{2}$ $m = 12.5$ ③ $y = 12.5(7)$
 $= 87.5 \text{ km}$

2. The time it takes to fly from Los Angeles to New York varies inversely as the speed of the plane. If the trip takes 6 hours at 900 km/h, how long would it take at 800 km/h?

① $y = \frac{m}{x}$ ② $900 = \frac{m}{6}$ ③ $800 = \frac{5400}{x}$
 $m = 900(6) = 5,400$ $x = 6.75 \text{ hrs}$

Solving Rational Equations

Rational equation: Equation with a variable in denominator

Proportion: One fraction set equal to another

Extraneous solution: Answers that are algebraically correct, but they do not make original problem true

Restricted domain:

There are some x -values that cannot be used

Example 1 Solve a proportion

To solve a proportion, cross multiply. Remember to distribute when appropriate. Then solve for x . Always check for extraneous solutions.

$$A) \frac{20}{3x-5} = \frac{5}{x-2}$$

$$20(x-2) = 5(3x-5)$$

$$\begin{array}{r} 20x - 40 = 15x - 25 \\ -20x \qquad -20x \\ \hline \end{array}$$

$$\begin{array}{r} -40 = -5x - 25 \\ +25 \qquad +25 \\ \hline \end{array}$$

$$\frac{-15}{-5} = \frac{-5x}{-5}$$

$$x = 3 \quad \checkmark$$

Example 1 Solve a proportion

To solve a proportion, cross multiply. Remember to distribute when appropriate. Then solve for x. Always check for extraneous solutions.

$$c) \frac{x-3}{x+5} = \frac{x}{x+2}$$

$$x(x+5) = (x-3)(x+2)$$

$$x^2 + 5x = x^2 + 2x - 3x - 6$$

$$x^2 + 5x = x^2 - x - 6$$

$$\begin{array}{r} -x^2 \\ \hline 5x = -x - 6 \end{array}$$

$$\begin{array}{r} 5x = -x - 6 \\ +x \quad +x \\ \hline 6x = -6 \\ \frac{6x}{6} = \frac{-6}{6} \end{array}$$

$$x = -1$$

Homework is Page 6 in Packet