

Alg. II per. 1
Mrs. Bonn

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9/1/11

7:50 Fermat 2-4

Finish Temperature word problem

8:00 notes/
power point

GO TO:
~~BonnMath.com~~ → Alg. II documents
BonnMath.com (powerpoint/notes online)

Direct Variation

• what is it & how do I know it when I see it?

what is direct variation?

• definition:

Y varies directly as X means that $Y = KX$, where K is the constant of variation. (doesn't change)

• Another way of writing this is $K = \frac{Y}{X}$

*remember the constant is the thing that does not change

• Examples:

X	Y
6	12
7	14
8	16

Note: X increases 6, 7, 8
Y increases 12, 14, 16

Find the constant: (K)

$K = \frac{Y}{X}$ $K = \frac{12}{6} = 2$
K stays constant → $K = \frac{14}{7} = 2$ $K = \frac{16}{8} = 2$

Find the equation:
($Y = KX$)

$Y = 2X$

X	Y
10	30
5	15
3	9

$K = \frac{Y}{X}$ $K = \frac{30}{10} = 3$

$Y = 3X$

$K = \frac{15}{5} = 3$ $K = \frac{9}{3} = 3$

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Is this a direct variation?

If yes, find the constant of variation (K), and the equation:

x	y	$K = y/x$	
4	6	$K = \frac{6}{4} = \frac{3}{2}$	$\frac{12}{8} = \frac{3}{2}$
8	12		
12	18	$\frac{18}{12} = \frac{3}{2}$	$\frac{27}{18} = \frac{3}{2}$
18	27		

$y = 3/2 x$

x	y	$K = \frac{y}{x}$
10	25	$\rightarrow \frac{5}{2}$
6	15	$\rightarrow \frac{5}{2}$
4	10	$\rightarrow \frac{5}{2}$
2	5	$\rightarrow \frac{5}{2}$

x	y
15	5
3	26
1	75
2	150

NOT a direct variation!
K values are different!

$K = \frac{y}{x}$ $K = \frac{5}{15} = \frac{1}{3}$ $K = \frac{26}{3}$
 $K = \frac{75}{1} = 75$

Given that y varies directly w/x, and y = 28 when x = 7, Find x when y = 52

x	y
7	28
?	52

- Find the constant:
 $K = \frac{y}{x} = \frac{28}{7} = 4$
- Use $y = kx$, find x
 $y = kx$ $52 = \frac{(4)}{4} x$

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word problem:

A car uses 8 gallons of gasoline to travel 290 miles. How much will the car use to travel 400 miles?

① Find points in table

x (gas)	y (miles)
8	290
?	400

② Find constant

$$k = \frac{y}{x} \quad k = \frac{290}{8} =$$

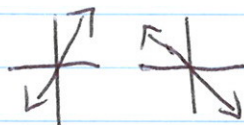
③ Find x when $y=400$, use $y=kx$
 $400 =$

• Direct variation & its graph:

$$y = mx + b \quad m = \text{slope} \quad b = y \text{ intercept}$$

what do direct variations look like on a ~~line~~ graph?

*Direct variations must go through the origin of a graph:



Tonight's HW

HOMWORK: Direct variation worksheet

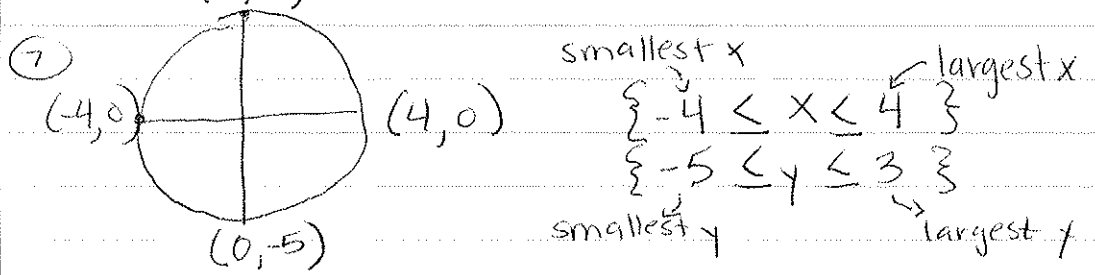
*remember power point lesson/notes online

8:35 Review
HW

Domain & Range HW

③ $(-5, 1)$ \circ $(4, -4)$ \bullet

$$\{-5 < x \leq 4\}$$
$$\{-4 \leq y < 1\}$$



Worksheet ~ Functions, Graphing, Slope & Equations of Lines**Answer the following questions about relations & functions.**

- 1.) Given the relation: $\{(-1, 3), (3, 7), (2, 3), (0, -2), (5, -1)\}$, answer the following:
- (a) Graph the relation (b) Make a mapping of the relation
 (c) State the domain (d) State the range
 (e) Is this relation a function? Why or why not?
- 2.) Given the following functions, evaluate the following: $f(x) = 2x - 5$ $g(x) = \frac{1}{2}x + 7$
- (a) $f(-3)$ (b) $g(-1)$ (c) $f(-6)$ (d) $g(f(3))$

Graph the following lines.

- 3.) $y = \frac{3}{4}x - 2$ 4.) $x = -4$ 5.) $5x - 3y = -30$
- 6.) $x - y = 0$ 7.) $y = 2$ 8.) $y = -x + 3$

Find the slope of the line through each pair of points.

- 9.) $(-4, 5)$ & $(3, -8)$ 10.) $(-3, 8)$ & $(2, 8)$ 11.) $(1, -8)$ & $(1, 2)$

Find the slope and intercepts of each line.

- 12.) $y = -2x + 3$ 13.) $x = 7$ 14.) $3x - 4y = 24$

Write the equation for the line described below IN STANDARD FORM.

- 15.) Slope = $\frac{2}{3}$ containing the point $(-3, 5)$ 16.) Containing $(-4, 6)$ and $(-3, -8)$
- 17.) Parallel to $y = 3x - 9$, containing $(-4, 5)$ 18.) Perpendicular to $y = 6$
- 19.) Containing $(-4, 9)$ and $(-4, 11)$ 20.) $y = \frac{2}{9}x - 14$

Write the equation of the line described below IN SLOPE-INTERCEPT FORM.

- 21.) Slope = $\frac{1}{5}$ containing the point $(-2, 8)$ 22.) Containing $(-2, 5)$ and $(-3, 5)$
- 23.) Parallel to $y = \frac{5}{6}x$, containing $(-6, 5)$ 24.) Perpendicular to $y = \frac{1}{2}x$, through $(0, 3)$
- 25.) $6x - 5y = -3$ 26.) Horizontal through $(4, -5)$

Direct Variation Worksheet

Solve the following direct variations. Leave as improper fractions if necessary.

1. If m varies directly as r and m is 6 when r is 36, find the constant of variation.
2. In the following charts, does one variable vary directly with the other?

a.

x	1	2	3	4	5
y	2	4	6	8	10

b.

x	1	2	3	4	5
y	2	4	9	12	15

3. "y varies directly as x". If $y = 3$ when $x = 24$, find y when $x = 10$.
4. The mass of a substance varies directly as the volume of the substance. If the mass of 2 liters of the substance is 10 kilograms, what will be the volume of 35 kilograms of the substance?
5. There are about 200 calories in 50 grams of Swiss cheese. Willie ate 70 grams of this cheese. About how many calories were in the cheese that he ate if the number of calories varies directly as the weight of the cheese?
6. Under certain conditions the pressure of a gas varies directly as the temperature. When the pressure is 800 torr, the temperature is $400k^{\circ}$. What is the temperature when the pressure is 450 torr?
7. The distance traversed by a car traveling at a constant speed is directly proportional to the time spent traveling. If the car goes 75 miles in 5 hours, how far will it go in 7 hours?
8. A salesman's commission varies directly as his sales. If the commission is \$100 for \$1000 in sales, find the commission for \$1750 in sales.
9. The number of girls in a class varied directly as the number of boys. One class had 3 boys and 21 girls. If another class had 5 boys, how many girls were in this class?
10. Peaches varied directly as apples. When there were 40 peaches, there were 120 apples. How many apples went with 500 peaches?