Problem 2:

Suppose x and y vary inversely. $\left(y = \frac{k}{x}\right)$ and $x = 2$ when $y = 8$.

a. What is the function of the inverse variation?

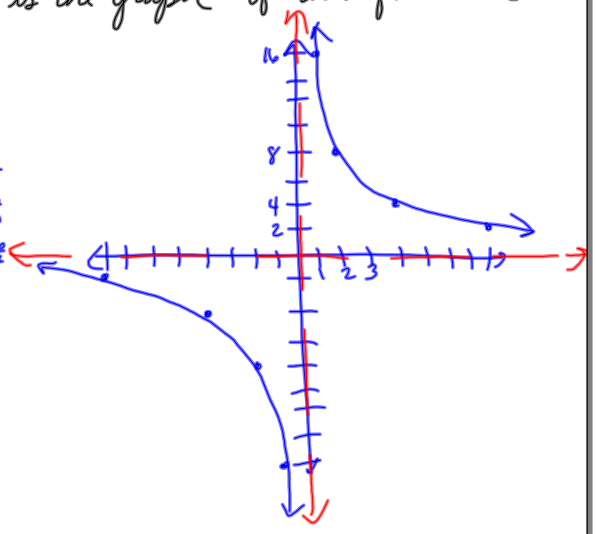
$y = \frac{k}{x}$ $\quad 2 \cdot 8 = \frac{k}{2} \cdot 2$ $\quad k = 16$

$y = \frac{16}{x}$

b. What is the graph of this function?

$y = \frac{16}{x}$

x	y	
1	16	$\frac{16}{1}$
2	8	$\frac{16}{2}$
4	4	$\frac{16}{4}$
8	2	
-1	-16	
-2	-8	
-4	-4	
-8	-2	



c. What is y when $x = 4$?

$y = \frac{16}{x} = \frac{16}{4} = 4$

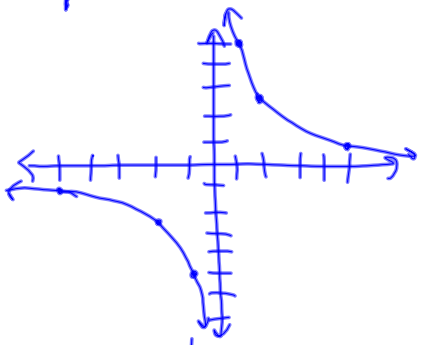
Suppose x and y vary inversely. Write the a function, b graph it, and c find y when $x = 10$.

a. $x = 1$ when $y = 5$

$y = \frac{k}{x}$ $\quad 1 \cdot 5 = \frac{k}{1} \cdot 1$ $\quad k = 5$

$y = \frac{5}{x}$

x	y	
1	5	
2	$\frac{5}{2}$	(2.5)
5	1	
-1	-5	
-2	-2.5	
-5	-1	



$y = \frac{5}{x} = \frac{5}{10} = \frac{1}{2}$ $\quad y = \frac{1}{2}$

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Problem 3:

Number of muffins(m)	Sales(s)
5	12.50
8	20.00
13	32.50
20	50.00

a. Write a function.

$s = 2.50m$

$\frac{y}{x} = \frac{kx}{x}$

b. How many muffins must you sell to make at least $250 in sales?

100 muffins

$k = \frac{y}{x} = \frac{20}{8} = \frac{10}{4} = \frac{5}{2} = 2.50$

$\frac{250}{2.50} = \frac{2.50m}{2.50}$

$100 = m$

Combined Variations

z varies jointly with x and y $z = kxy$

z varies jointly with x and y and inversely with w $z = \frac{kxy}{w}$

z varies directly with x and inversely with the product wy $z = \frac{kx}{wy}$

Problem 4:

Write the function. Find z when $x=4$ and $y=9$.

a. z varies directly with x and inversely with y. When $x=6$, $y=2$, $z=15$.

$z = \frac{kx}{y}$ $15 = \frac{k(6)}{2}$ $\Rightarrow \frac{15}{3} = \frac{k3}{3}$ $k=5$

$z = \frac{5x}{y} = \frac{5(4)}{9} = \frac{20}{9}$ $z = \frac{20}{9}$

b. z varies inversely with the product of x and y. When $x=2$ and $y=4$, $z=0.5$.

$z = \frac{k}{xy}$ $0.5 = \frac{k}{2 \cdot 4}$ $8(0.5) = \frac{k}{8} \cdot 8$

$4 = k$

$z = \frac{4}{xy} = \frac{4}{(4)(9)} = \frac{1}{9}$ $z = \frac{1}{9}$

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Direct variation. Find the missing value.

a. (2, 5) (4, y)

$x=2,\ y=5$

$y = kx$

$\frac{5}{2} = \frac{k(2)}{2}$

$\frac{5}{2} = k$

$y = \frac{5}{2}x$

$y = \frac{5}{2} \cdot 4_2 = 10$

OR use proportions

$k = \frac{y}{x}$

$\frac{y_1}{x_1} = \frac{y_2}{x_2}$

$\frac{5}{2} = \frac{y}{4}$

$20 = 2y$

$10 = y$

$$\frac{6x^2+19x-7}{3x^2-5x-2}$$

$a \cdot c$: -42; $1 \cdot 42$, $2 \cdot 21$, $3 \cdot 14$, $6 \cdot 7$

-6, $1 \cdot 6$

$3x^2-6x+1x-2$

$3x(x-2)+1(x-2)$

$(x-2)(3x+1)$

$6x^2+2x-21x-7$

$2x(3x+1)-7(3x+1)$

$\frac{(3x+1)(2x-7)}{(x-2)(3x+1)}$

$\frac{2x-7}{x-2}$, $x \neq 2, -\frac{1}{3}$

$3x+1=0$

$-1 \quad -1$

$\frac{3x}{3}=\frac{-1}{3}$

$x=-\frac{1}{3}$