

T-AZ Algebra 2 Week 12 11/29

Direct Variation $y = kx$ $k = \frac{y}{x}$

If $x = 8$ when $y = 18$

Find y when $x = 12$

k is the slope

$$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}}$$

1.) Find k

$$y = kx$$

$$k = \frac{y}{x} = \frac{18 \div 2}{8 \div 2} = \frac{9}{4}$$

$$\left\{ \begin{array}{l} y = \frac{9}{4}x \end{array} \right.$$

$$y = \frac{9}{4}(12) = \frac{108}{4} = \boxed{27}$$

If $x = 20$ when $y = 24$

Find x when $y = 18$

$$k = \frac{y}{x} = \frac{24 \div 4}{20 \div 4} = \frac{6}{5}$$

$$y = kx \quad y = \frac{6}{5}x$$

$$\frac{5}{6} \left(\frac{18}{1} \right) = \frac{90}{6}$$

$$\frac{5}{6} (18) = \left(\frac{6}{5} x \right) \frac{5}{6}$$

$$\rightarrow \boxed{15}$$

$$\frac{5}{\cancel{6} \div 6} \left(\frac{3}{1} \right) = \frac{5}{1} \left(\frac{3}{1} \right) = \boxed{15}$$

$$y = kx$$

Is direct variation?

1.) $y = -3x$
yes $k = -3$

2.) $\frac{4x}{6} = \frac{6y}{6}$ $y = \frac{4}{6}x$
yes
 $k = \frac{2}{3}$ $y = \frac{2}{3}x$

3.) $y = 2x + 3$
No

4.) $8x + 12y = 0$
 $-8x$ $-8x$
yes
 $\frac{12y}{12} = \frac{-8x}{12}$ $k = -\frac{2}{3}$

$$y = -\frac{8}{12}x = y = -\frac{2}{3}x$$

x	y	$k = \frac{y}{x}$
0	0	$\frac{0}{0}$ this is ok
→ 2	3	$\frac{3}{2}$
→ -4	-6	$\frac{-6}{-4} = \frac{3}{2}$
→ 10	15	$\frac{15 \div 5}{10 \div 5} = \frac{3}{2}$

$$y = \frac{3}{2}x$$

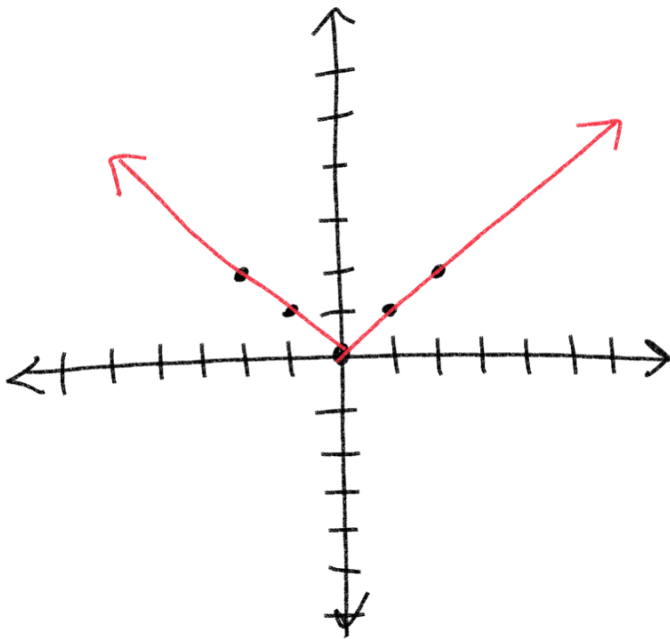
x	y	$k = \frac{y}{x}$
→ 1	3	$\frac{3}{1} = 3$
→ 2	6	$\frac{6}{2} = 3$
→ 3	12	$\frac{12}{3} = 4$

not direct variation

x	y
0	2
3	6
-4	-8

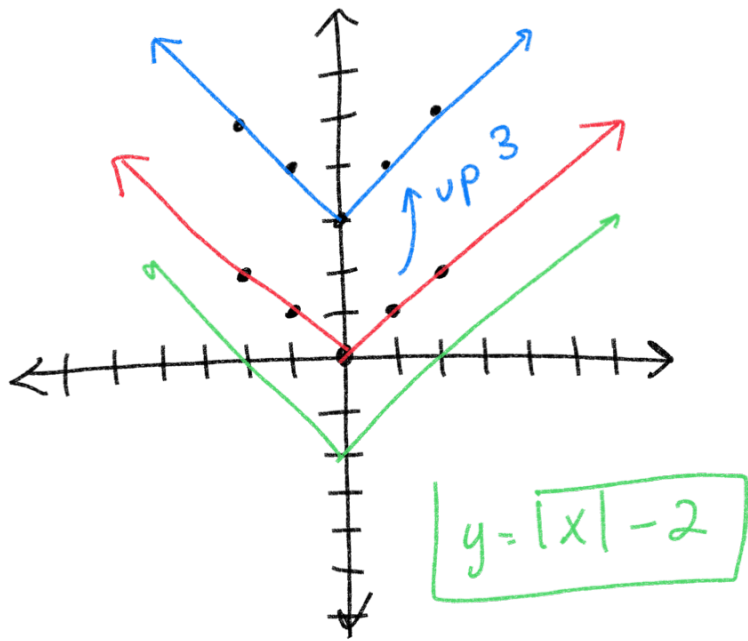
this has $\wedge \wedge$ to be $(0,0)$ \leftarrow GOAL!!!
 Not direct variation

Absolute Value Functions



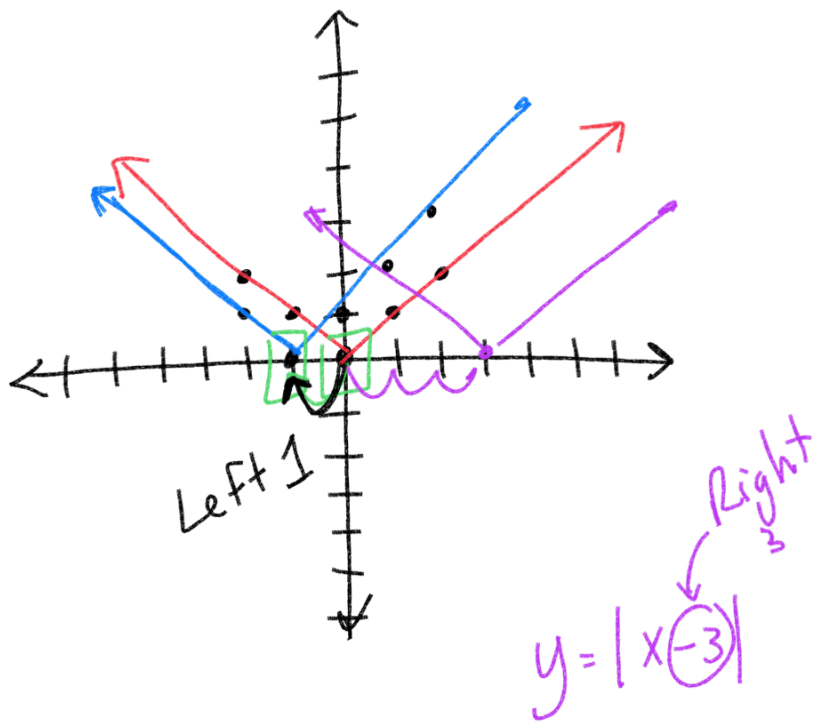
$$y = |x|$$

x	x	y
-2	$ -2 $	2 $(-2, 2)$
-1	$ -1 $	1 $(-1, 1)$
0	$ 0 $	0 $(0, 0)$
1	$ 1 $	1 $(1, 1)$
2	$ 2 $	2 $(2, 2)$



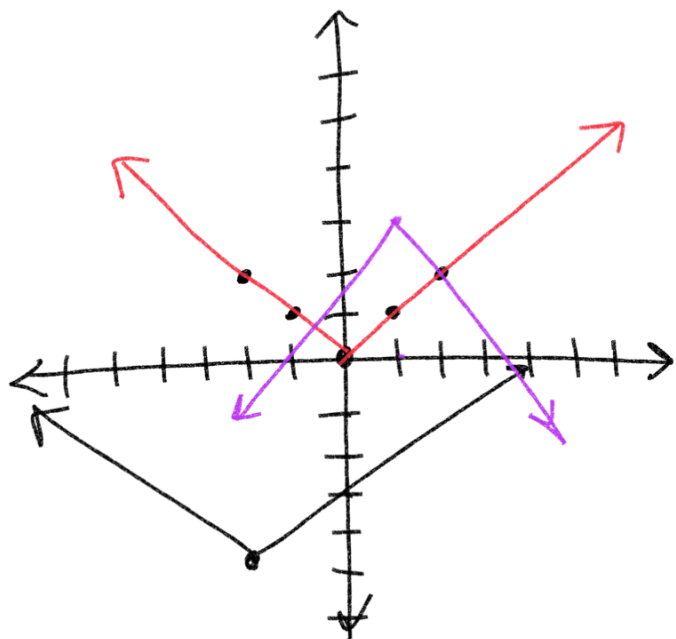
$$y = |x| + 3 \leftarrow \text{up } 3$$

x	$ x + 3$	y
-2	$ -2 + 3$ $2 + 3$	5 (-2, 5)
-1	$ -1 + 3$ $1 + 3$	4 (-1, 4)
0	$ 0 + 3$	3 (0, 3)
1	$ 1 + 3$	4 (1, 4)
2	$ 2 + 3$ $2 + 3$	5 (2, 5)



$$y = |x + 1| \leftarrow \text{Left } 1$$

x	$ x + 1 $	y
-2	$ -2 + 1 $ $ -1 $	1 (-2, 1)
-1	$ -1 + 1 = 0 $	0 (-1, 0)
0	$ 0 + 1 = 1 $	1 (0, 1)
1	$ 1 + 1 = 2 $	2 (1, 2)
2	$ 2 + 1 = 3 $	3 (2, 3)



$$y = |x + 2| - 5$$

Left 2
down 5

$$y = -|x - 1| + 3$$

flip
Right 1
up 3

$$y = \left| \frac{2x}{2} - \frac{2}{2} \right| + 4$$

$$y = |2(x - 1)| + 4$$

change slope
narrow/
stretch
Right 1
up 4

