

LINEAR FUNCTIONS

Function - a relation in which each x-coord is paired with EXACTLY ONE y-coord.

Yes $\{(2,7) (3,-1) (4,8) (-9,6)\}$

No $\{(4,5) (6,-3) (7,-4) (4,11)\}$

Yes $\{(8,-7) (-3,-7) (14,-7)\}$

* What is a function?

* Domain & Range

* Function Notation

* Lines

* slope

* Eq. of line

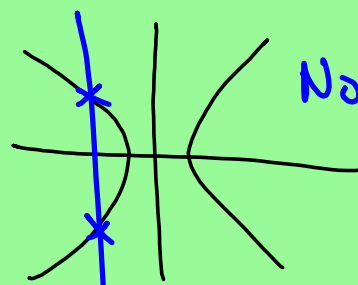
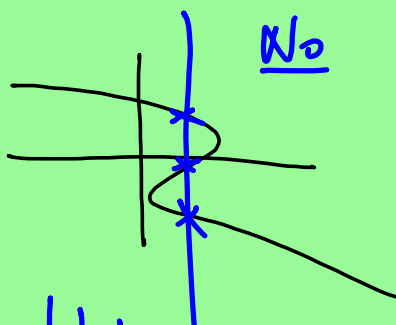
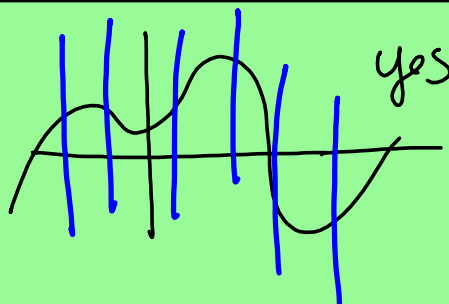
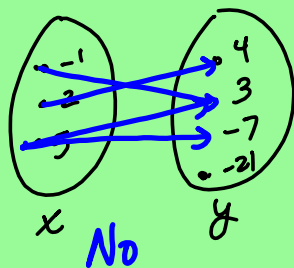
Mapping

Domain

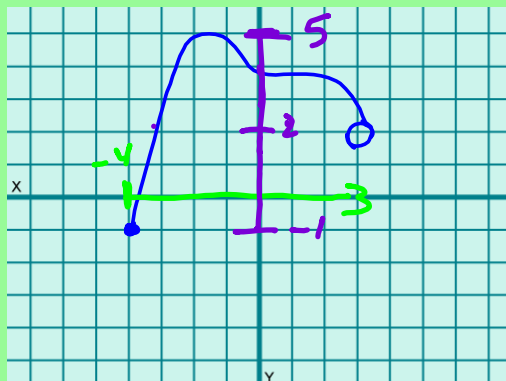
Set of x-word
 $\{-1, 2, 5\}$

Range

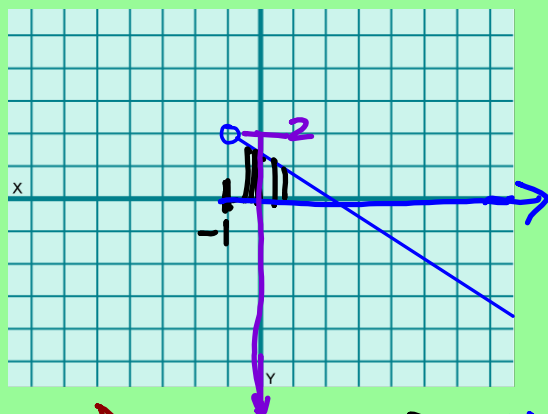
Set of y-word.
 $\{4, 3, -7, -2\}$



$\{(-3, 4) (5, -8) (7, 2) (9, -5)\}$
 Domain: $\{-3, 5, 7, 9\}$
 Range: $\{4, -8, 2, -5\}$



Domain: $-4 \leq x < 3$
 Range: $-1 \leq y \leq 5$



Domain: L to R $x > -1$
 Range: Low to high $y < 2$

FUNCTION NOTATION

$$f(x) = x^2 + 2x - 3$$

f of x

Find $f(2) = 2^2 + 2(2) - 3$
 $= 4 + 4 - 3$
 $= 5$
 $(2, 5)$

$$g(x) = \frac{3x-1}{x^2}$$

$$g\left(\frac{1}{2}\right) = \frac{3\left(\frac{1}{2}\right) - 1}{\left(\frac{1}{2}\right)^2}$$

$$= \frac{\frac{3}{2} - \frac{1}{1.2}}{\frac{1}{4}}$$

$$= \frac{\frac{3}{2} - \frac{2}{2}}{\frac{1}{4}} = \frac{\frac{1}{2}}{\frac{1}{4}} = \frac{1}{2} \cdot \frac{4}{1} = 2$$

$$f(x) = \frac{x+1}{3} \quad D: \{-5, -1, \frac{1}{2}, 8\} \quad \text{Find range.}$$

$$f(-5) = \frac{-5+1}{3} = -\frac{4}{3}$$

$$f(-1) = \frac{-1+1}{3} = 0$$

$$f\left(\frac{1}{2}\right) = \frac{\frac{1}{2} + \frac{1}{2}}{3} = \frac{\frac{2}{2}}{3} = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{2}$$

$$f(8) = \frac{8+1}{3} = \frac{9}{3} = 3$$

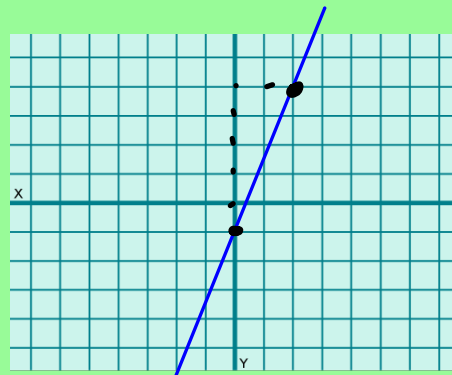
$$\text{Range: } \left\{-\frac{4}{3}, 0, \frac{1}{2}, 3\right\}$$

LINES

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$(2, -3)$ $(4, -9)$ Find slope.

$$m = \frac{-3 - (-9)}{2 - 4} = \frac{6}{-2} = \textcircled{-3}$$



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

Babysitting

Kelly
flat fee \$10
\$6 per hour

Kim

Hrs	\$
1	22
2	26
3	30
4	34

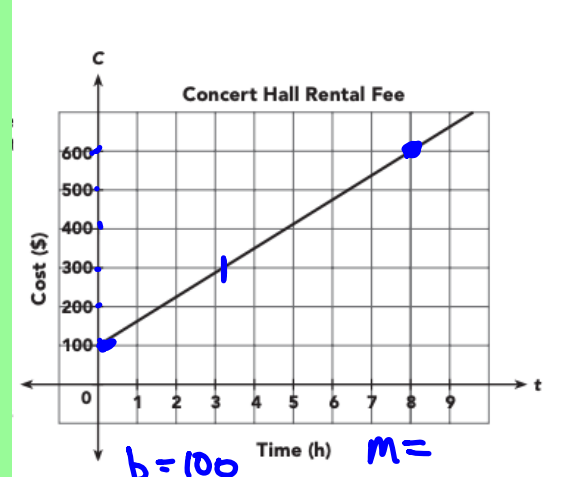
}4
}4

Who charges more per hour?

Kelly = \$6 Kim = \$4

What is Kim's flat fee?
Kelly = \$10 Kim: 0 hrs. 18

$$y = 6x + 10 \quad y_2 = 4x + 18$$



Slope-Intercept $\leftarrow$ y-int
 $y = mx + b$
 $\uparrow$ slope $\uparrow$ y-int
 $\frac{500}{8} = 62.5$

$$y = 62.5x + 100$$

Container P

$$m = \frac{900}{-60} = -15 \quad b = 1000$$

$$y = -15x + 1000$$

Container Q

$$m = \frac{600}{-60} = -10 \quad b = 800$$

$$y = -10x + 800$$

