

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

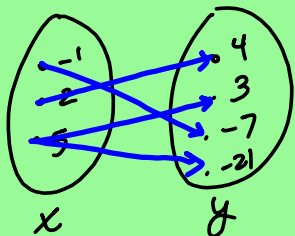
* Lines

* slope

* Eq. of line

x-coord cannot repeat with different y-coords

Mapping



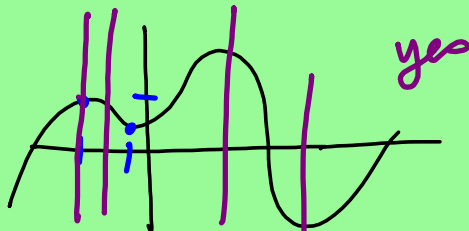
no

Domain

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

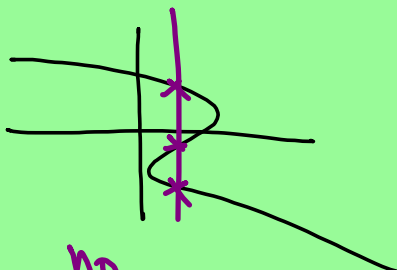
Range

set of y-word
 $\{4, 3, -7, -21\}$

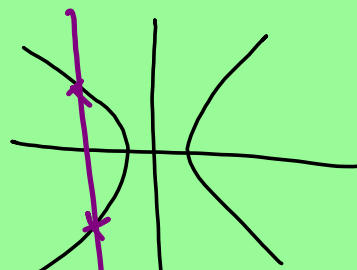


yes

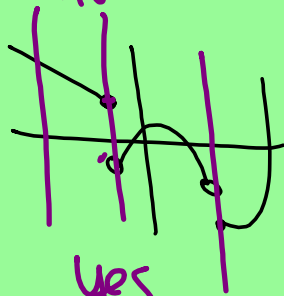
Vertical line test



no

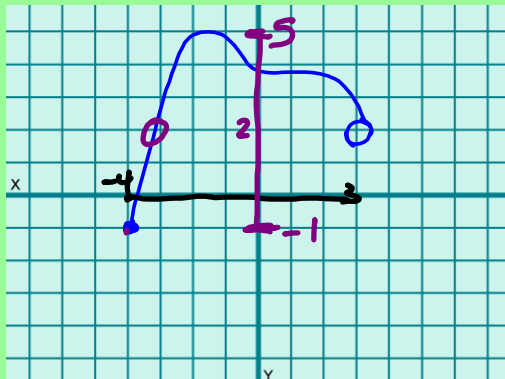


No

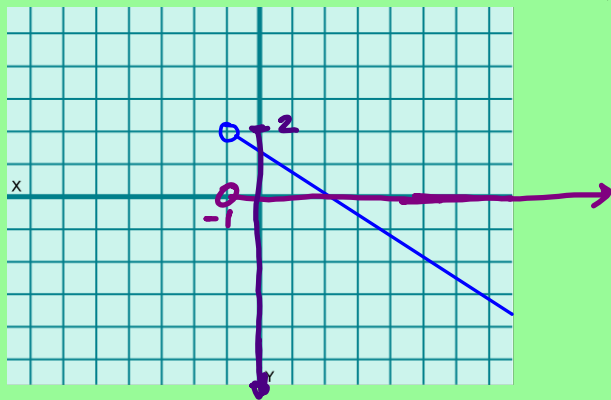


yes

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



L to R
 Domain: $-4 \leq x < 3$
 Range: $-1 \leq y \leq 5$
 Low to High



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

FUNCTION NOTATION

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

f of x

$$\begin{aligned} \text{Find } f(2) &= (2)^2 + 2(2) - 3 \\ &= 4 + 4 - 3 \\ &= 5 \end{aligned}$$

$$(2, 5)$$

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

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

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

$$\left(\frac{1}{2}, 2\right) = \frac{1}{2} \cdot \frac{4}{1} = 2$$

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

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

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

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

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

$$f\left(\frac{1}{2}\right) = \frac{\frac{1}{2} + \frac{1}{2}}{3} = \frac{\frac{2}{2}}{3} = \frac{1}{2} \cdot \frac{1}{3} = \frac{1}{6}$$

LINES

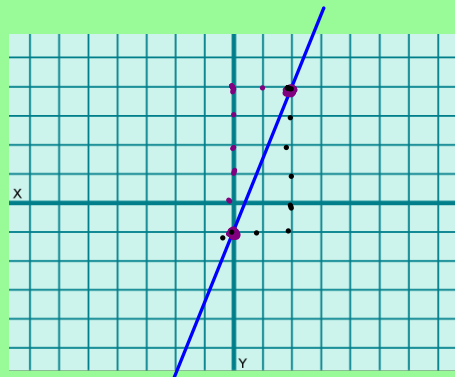
$$m = \text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

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

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

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

$$y = \frac{5}{2}x - 1$$



Slope-intercept form

$$y = mx + b$$

↑
y-int

Babysitting

Kelly
 flat fee \$10
 \$6 per hour

$$y = 6x + 10$$

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

Who charges more per hour?

Kelly

What is Kim's flat fee?

$$\begin{array}{r} 0 \overline{)18} \\ \underline{0} \\ 18 \end{array}$$

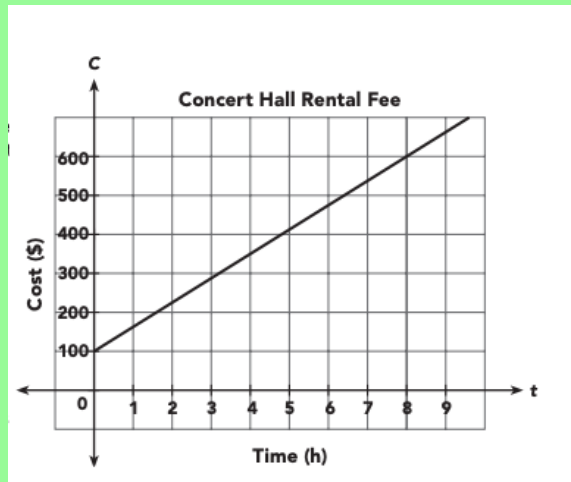
\$18

Kim
 $y = 4x + 18$

Hrs	\$
1	22
2	26
3	30
4	34

16
16

4
4



Container P

Container Q

