

①

x	y
0	2
2	4
3	6
4	

function
 Domain: $\{0, 2, 3, 4\}$
 Range: $\{2, 4, 6\}$

②

x	y
0	-3
1	-6
4	-18
	-24

not function

③ $(1, 4), (2, 5), (3, 9), (2, -6)$
 not function

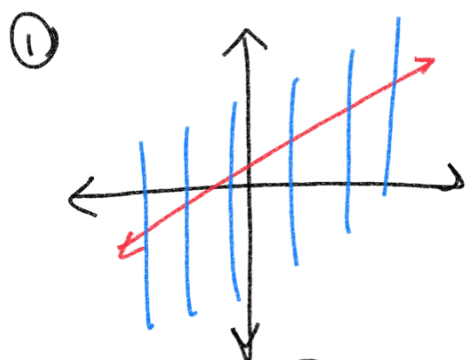
④ $(-1, 3), (0, 8), (2, 18), (-3, -7)$

function

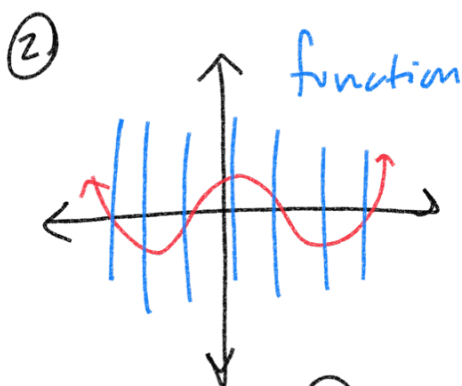
Domain: $\{-1, 0, 2, -3\}$

Range: $\{3, 8, 18, -7\}$

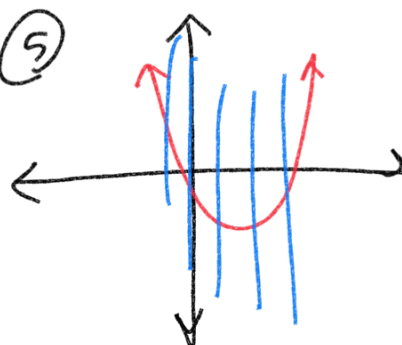
Vertical Line Test



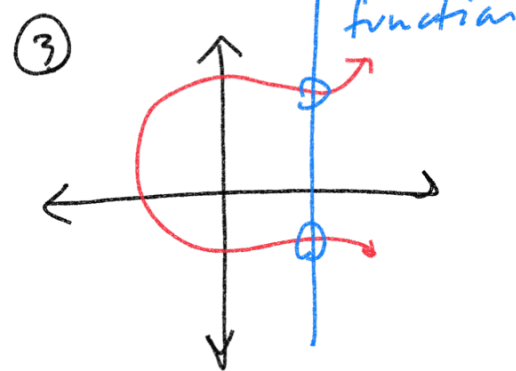
function



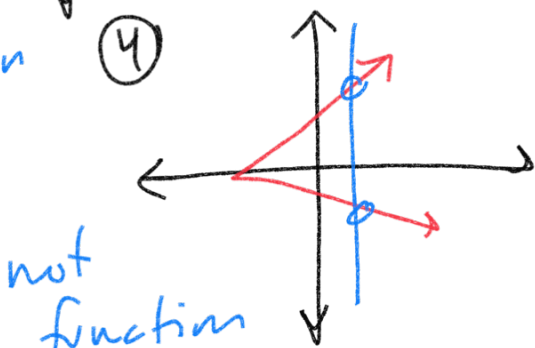
⑤



function



not function



not function

$$f(x) = 3x^2 + 6x + 12$$

← "six" "seis" "sechs"

$$f(-1) = 3(-1)^2 + 6(-1) + 12$$

$$3(1) + 6(-1) + 12$$

$$3 + (-6) + 12$$

$$-3 + 12 = 9$$

Input $\rightarrow -1 = x$
 output $\rightarrow 9 = y$

$(-1, 9)$

$$f(4) = 3(4)^2 + 6(4) + 12$$

$$3(16) + 6(4) + 12$$

$$48 + 24 + 12 = \boxed{84}$$

$(4, 84)$

$$y = -2x + 4$$

slope = -2
 $\frac{\text{down } 2}{1 \text{ right}}$
 y-int = 4

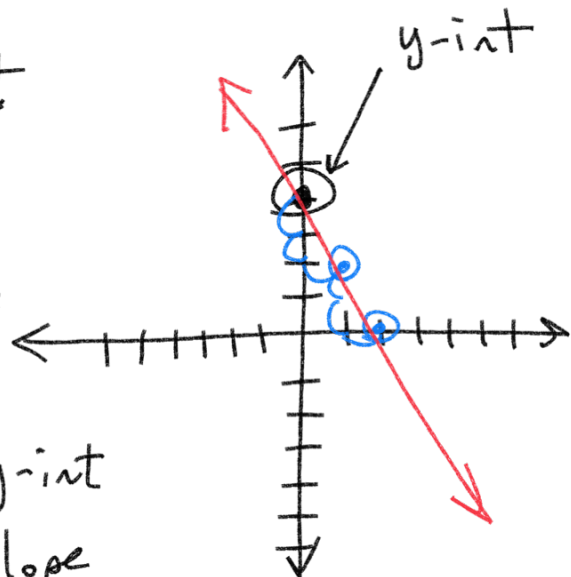
slope-intercept

$$y = mx + b$$

slope \uparrow y-int \uparrow

1st: plot y-int

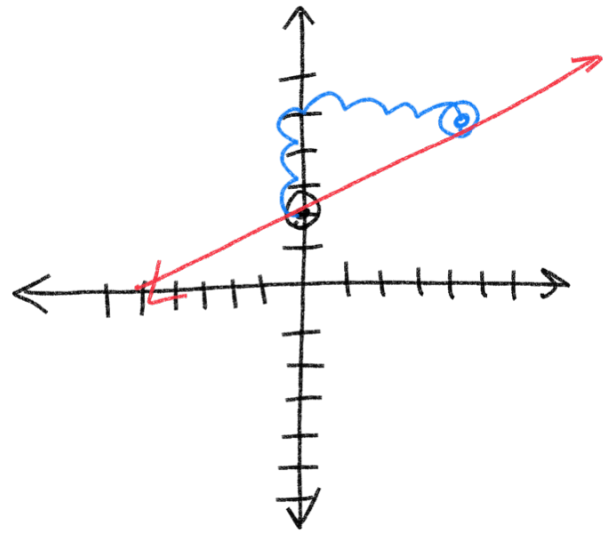
2nd: use slope
for next point



$$y = \frac{3}{4}x + 2$$

slope = $\frac{3}{4}$ up 3
4 right

y-int: 2



Standard form

$$Ax + By = C$$

$$4x + 3y = 12$$

$x=0$

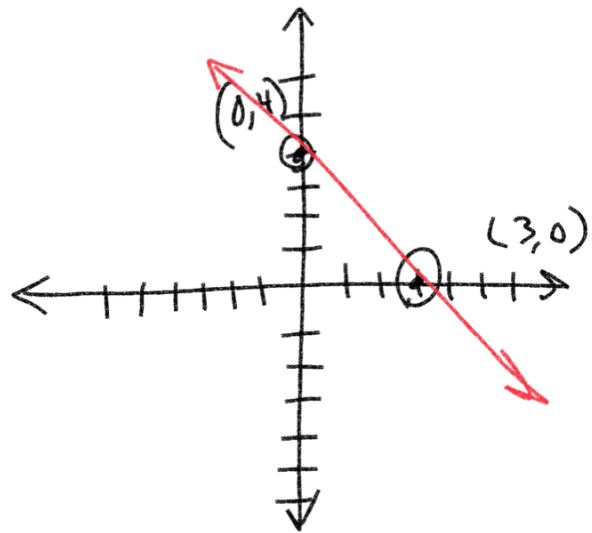
$$4x + 3y = 12 \quad (0, 4)$$

$$y = 4$$

$y=0$

$$4x + 3y = 12 \quad (3, 0)$$

$$x = 3$$



$$6x - 9y = 18$$

$y=0$

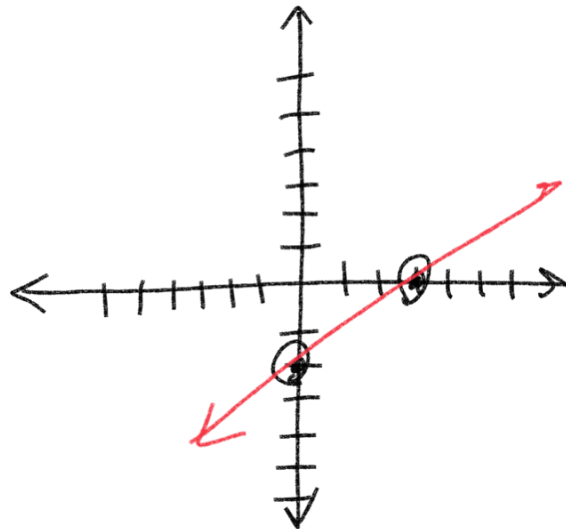
$$6x - 9y = 18 \quad (3, 0)$$

$$x = 3$$

$x=0$

$$6x - 9y = 18 \quad (0, -2)$$

$$y = -2$$



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

$$\begin{array}{cc} x_1, y_1 & x_2, y_2 \\ (4, 3) & (6, 9) \end{array}$$

$$\frac{9 - 3}{6 - 4} = \frac{6}{2} = \boxed{3}$$

Find slope.

$$\begin{array}{cc} (1, 3) & (5, 11) \\ x \ y & x \ y \end{array}$$

$$\text{slope} = m = \frac{3 - 11}{1 - 5} = \frac{-8}{-4} =$$

$$\boxed{2}$$

$$(x_2 - x_1) \overset{\text{slope}}{m} = \frac{y_2 - y_1}{x_2 - x_1} (x_2 - x_1)$$

Point-Slope Form

$$y - y_1 = m(x - x_1)$$

Find the equation for a line with $m = 4$ that contains $(3, 2)$.

Point-Slope

$$y - y_1 = m(x - x_1)$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ y - 2 & = & 4(x - 3) \end{array}$$

$$\begin{array}{ccc} y - 2 & = & 4x - 12 \\ +2 & & +2 \end{array}$$

$$\boxed{y = 4x - 10}$$

slope-intercept form

$$\begin{array}{ccc} y = mx + b & & \\ \downarrow & \downarrow & \downarrow \\ 2 = (4)(3) + b & & \\ 2 = 12 + b & & \\ -12 & -12 & \\ -10 = b & & \end{array}$$

$$\begin{array}{ccc} y = mx + b & & \\ \boxed{y = 4x - 10} & & \end{array}$$

