

2-1 Relations and Functions



1.) $f(x) = 5x + 2$

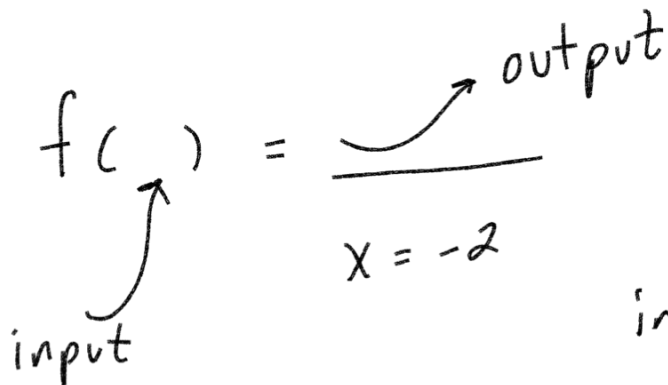
$f(x)$ function with respect to x

$y = 5x + 2$

$f(x) = 5x + 2$

$f(-2) = 5(-2) + 2$

input = -2 $5(-2) + 2$
 output = -8 $-10 + 2 = -8$



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

$f(x) = 5x + 2$

$f(-\frac{1}{2}) = 5(-\frac{1}{2}) + 2$

input \nearrow $-\frac{5}{2} + 2$ output
 $-\frac{5}{2} + \frac{4}{2} = \left(-\frac{1}{2}\right)$

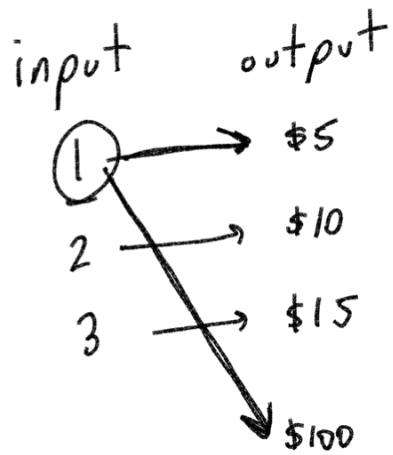
$f(3) = 5(3) + 2$

input \nearrow $15 + 2$
 17
output
(9)

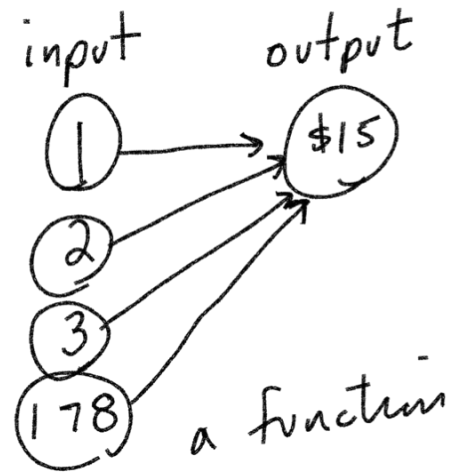
$f(7) = 5(7) + 2$

input \nearrow $35 + 2$
 37
 output

In order for you to have a function,
every input must have one — and only one —
output

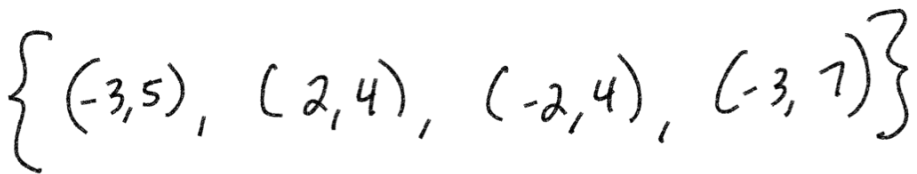
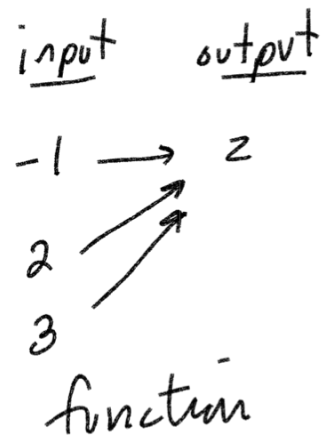
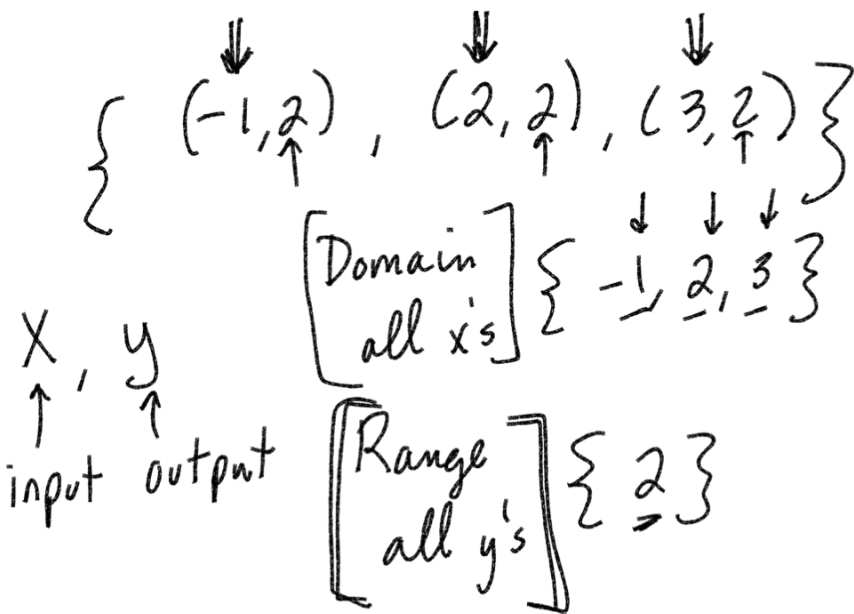


not a function

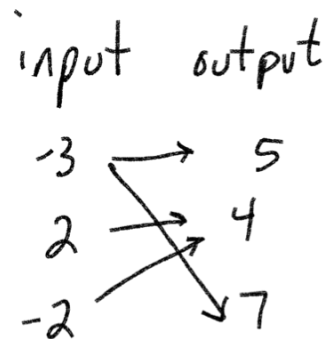


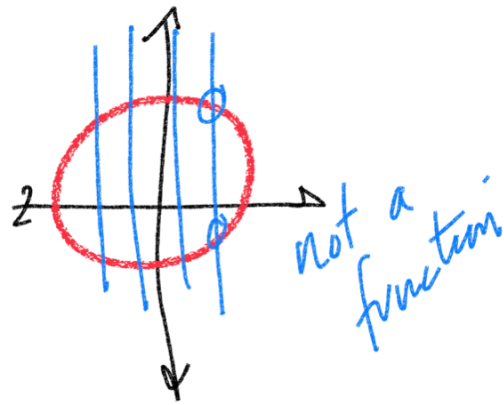
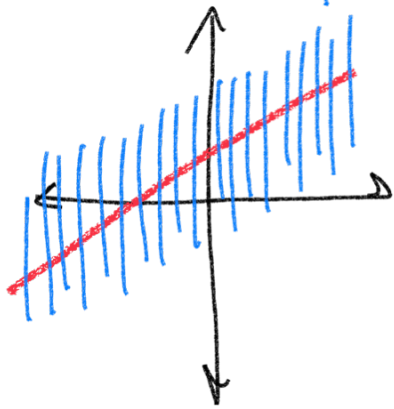
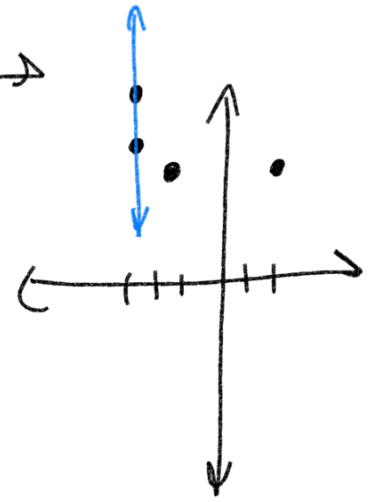
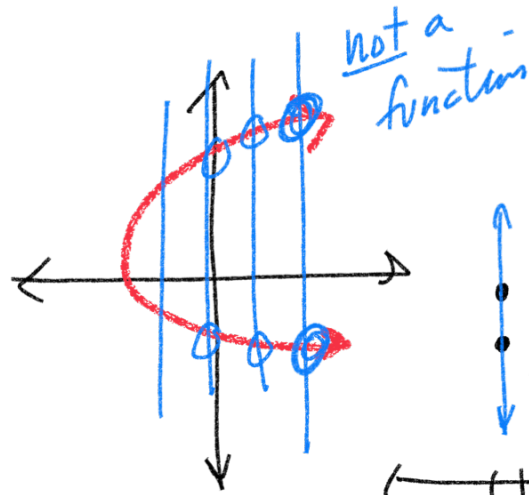
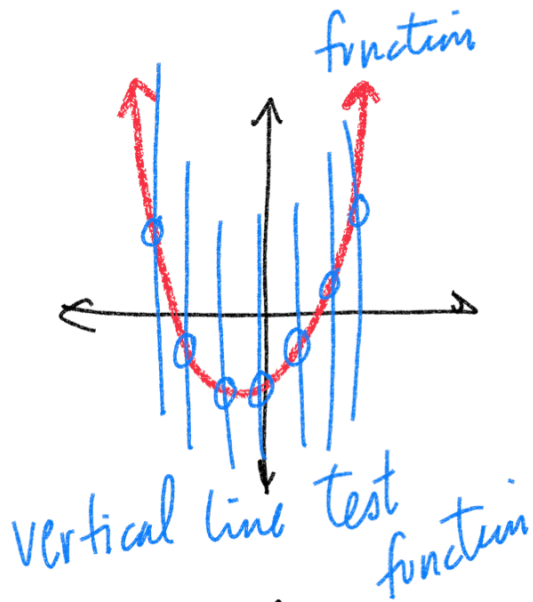
a function

But different inputs may have the same output



not a function





$(2, 8), (3, 11), (-2, 8), (-3, 12)$ function

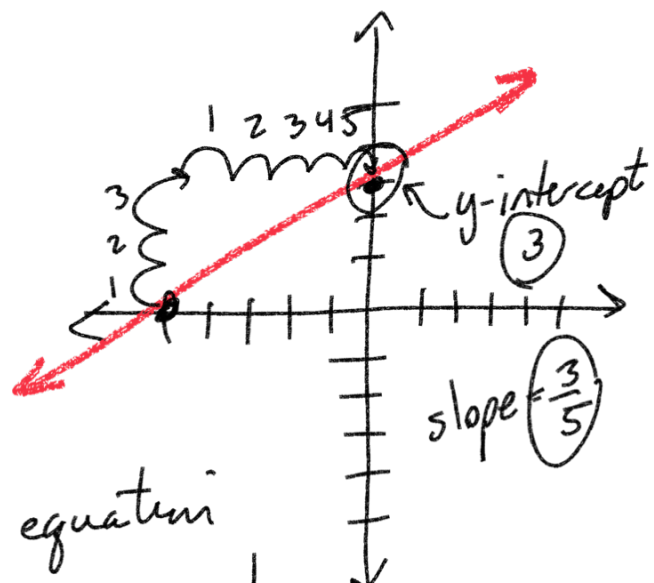
domain: $\{2, 3, -2, -3\}$

range: $\{8, 11, 12\}$

2-2 Linear Equations

$$y = mx + b$$

\uparrow slope \uparrow y-intercept



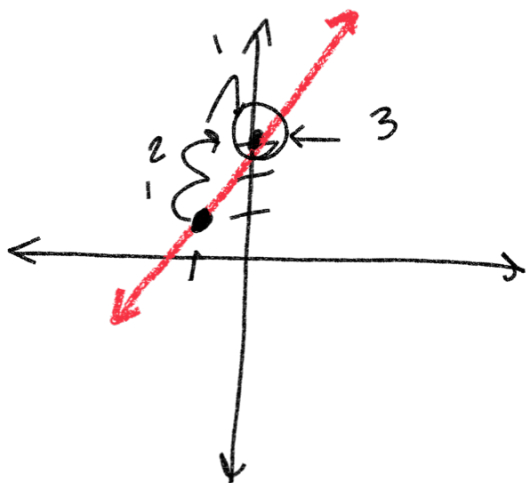
$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

linear equation

$$y = mx + b$$

$$y = \frac{3}{5}x + 3$$



Linear Equation
 $y = mx + b$

$$y = 2x + 3$$

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{up}}{\text{right}} = \frac{2}{1} = 2$$

1.) $m=4$ slope contains $(3, 2)$ $x=3$ $y=2$

① slope-intercept form $y = mx + b$

$$y = 4x + b$$
$$\downarrow$$
$$2 = 4(3) + b$$
$$2 = 12 + b$$
$$\begin{matrix} -12 & -12 \end{matrix}$$

$$y = 4x + (-10)$$
$$y = 4x - 10$$

$$-10 = b$$

② Point-slope form

$m=4$
 $(3, 2)$
 x_1, y_1

$$y - y_1 = m(x - x_1)$$
$$y - 2 = 4(x - 3)$$
$$y - 2 = 4x - 12$$
$$\begin{matrix} +2 & +2 \end{matrix}$$

$$y = 4x - 10$$

$m = 3$ contains $(-2, -4)$

$$y = mx + b$$

$$-4 = 3(-2) + b$$

$$\begin{array}{r} -4 = -6 + b \\ +6 \quad +6 \end{array}$$

$$2 = b$$

$$y = mx + b \quad \boxed{y = 3x + 2}$$

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

$$y - (-4) = 3(x - (-2))$$

$$y + 4 = 3(x + 2)$$

$$\begin{array}{r} y + 4 = 3x + 6 \\ -4 \quad -4 \end{array}$$

$$\boxed{y = 3x + 2}$$

$$2x - 5y = 0 \quad \text{Find slope}$$

$$\begin{array}{r} -2x \end{array}$$

$$\begin{array}{r} -5y = -2x \\ \frac{-5y}{-5} = \frac{-2x}{-5} \end{array}$$

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

$$y = mx + b$$

$$y = \left(\frac{2}{5}\right)x \quad \leftarrow \text{slope} = \frac{2}{5}$$

$$\begin{array}{r} 3x + 8y = 0 \\ -3x \end{array}$$

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

$$y = \left(\frac{-3}{8}\right)x \quad \leftarrow \text{slope} = \frac{-3}{8}$$

Find slope

$$\begin{array}{cc} x_1, y_1 & x_2, y_2 \\ (-3, -2) & (1, 6) \end{array}$$

$$\left[\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} \right] = \frac{6 - (-2)}{1 - (-3)} = \frac{6 + 2}{1 + 3} = \frac{8}{4} = \textcircled{2}$$

Quiz 5
Ch 1 test
due tonight! HW
2-1 evens
2-2 evens
supplemental (22)
online HW 7 (sat)
Quiz w7 (sat)
due Oct 22nd