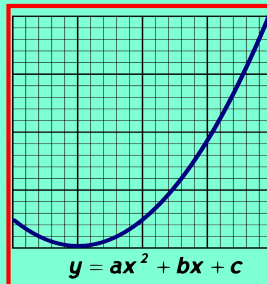


Math 125

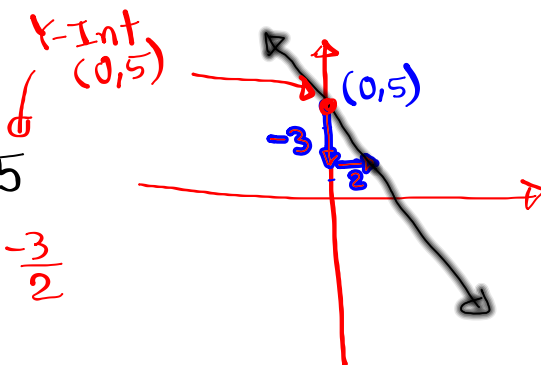
Fall 2021

Lecture 7



Class QZ 5

1) Graph $y = -\frac{3}{2}x + 5$
 $m = -\frac{3}{2}$



2) Solve & Graph.

$$2x - 8 < 4x + 6$$

$$2x - 4x < 6 + 8$$

$$-2x < 14$$

$$\frac{-2x}{-2} > \frac{14}{-2}$$

$$\boxed{x > -7}$$



More on Functions:

$x \rightarrow$ input \leftarrow Domain
 $y=f(x) \rightarrow$ output
 Range

$$f(x) = x^2 - 4$$

find

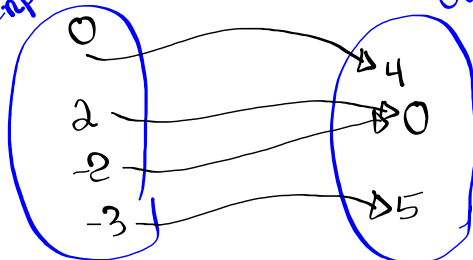
$$1) f(0) = (0)^2 - 4 = 0 - 4 = -4$$

$$2) f(2) = (2)^2 - 4 = 4 - 4 = 0$$

$$3) f(-2) = (-2)^2 - 4 = 4 - 4 = 0$$

$$4) f(-3) = (-3)^2 - 4 = 9 - 4 = 5$$

Input



Domain

Range

No input value can have more than one output value

$$f(x) = \frac{x-4}{x+2}$$

$\frac{\text{Zero}}{\text{NonZero}} = 0$

find

$$1) f(0) = \frac{0-4}{0+2} = \frac{-4}{2} = -2$$

$$2) f(-1) = \frac{-1-4}{-1+2} = \frac{-5}{1} = -5$$

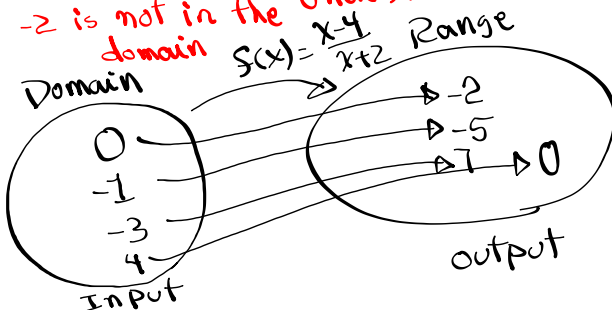
$$3) f(-3) = \frac{-3-4}{-3+2} = \frac{-7}{-1} = 7$$

$$4) f(4) = \frac{4-4}{4+2} = \frac{0}{6} = 0$$

$$5) f(-2) = \frac{-2-4}{-2+2} = \frac{-6}{0}$$

$\frac{\text{NonZero}}{\text{Zero}} \rightarrow$ undefined

-2 is not in the domain
 $f(x) = \frac{x-4}{x+2}$

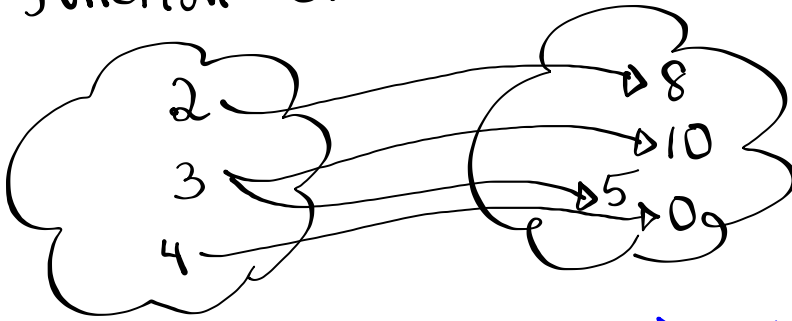


Domain

output

Input

Function or not



$(2,8), (3,10), (3,5), (4,0)$

Domain = $\{2, 3, 4\}$

Range = $\{8, 10, 5, 0\}$

Not a function

because

$3 \rightarrow 10$

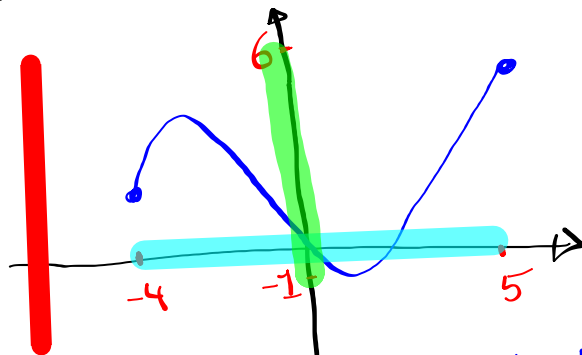
$3 \rightarrow 5$

same input

more than

one output

How to determine if a given graph is a function or not:



Domain:

$-4 \leq x \leq 5$

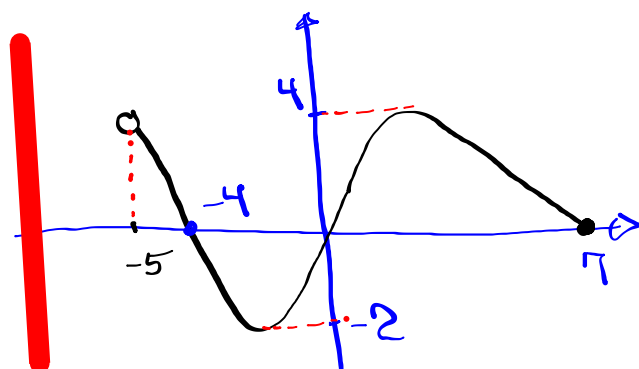
Range:

$-1 \leq y \leq 6$

Vertical line test: vertical line cuts the graph in one point only as we move along the domain

Yes

Consider the graph below



Domain:

$$-5 < x \leq 7$$

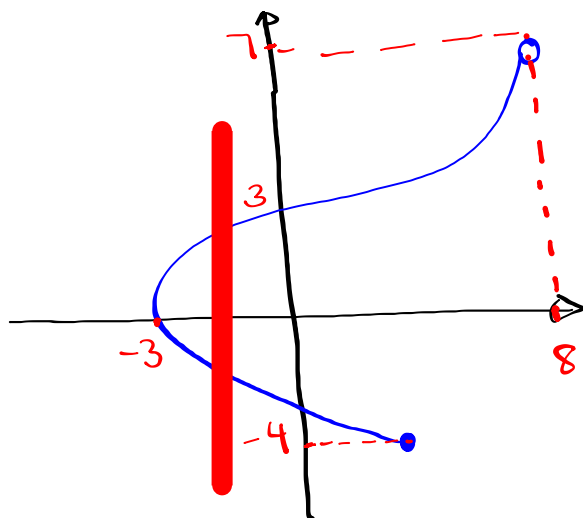
Range:

$$-2 \leq y \leq 4$$

Vertical line test: It is a function by V.L.T.

x-Ints: $(-4, 0)$, $(0, 0)$, $(7, 0)$

y-Int: $(0, 0)$



Domain:

$$-3 < x < 8$$

Range:

$$-4 \leq y < 7$$

V.L.T. Not a function, It crosses the graph in more than one location

$5x - 3y = 9$
 write in slope-Int Form
 $y = mx + b$
Isolate Y
 $5x - 3y = 9$
 $-3y = -5x + 9$
 $\frac{-3}{-3}y = \frac{-5}{-3}x + \frac{9}{-3}$
 $y = \frac{5}{3}x - 3$
 slope-Int Form
 $f(x) = \frac{5}{3}x - 3$
 Y-Int $(0, -3)$
 $m = \frac{5}{3}$

write $3x + 4y = 8$ in function notation.
 Isolate Y
 Replace Y with $f(x)$
 $4y = -3x + 8$
 $y = \frac{-3}{4}x + \frac{8}{4}$
 $y = \frac{-3}{4}x + 2$
 $f(x) = \frac{-3}{4}x + 2$
 Graph

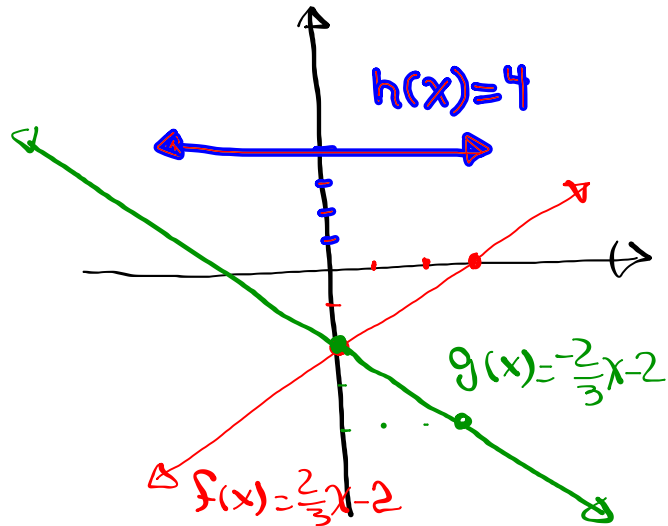
Graph

$$f(x) = \frac{2}{3}x - 2$$

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

$$h(x) = 4$$

$$y = 4$$



Simplify

$$\textcircled{1} (3x^2 - 5)(2x^2 + 5) = 6x^4 + 15x^2 - 10x^2 - 25 = \boxed{6x^4 + 5x^2 - 25}$$

$$\textcircled{2} (4x - 3)^2 + 24x = (4x - 3)(4x - 3) + 24x = \boxed{16x^2 + 9}$$

$\triangleright 16x^2 - 12x - 12x + 9 + 24x$

$$\textcircled{3} 2x^3(3x^2 - 5x - 1) - 6x^5 = \cancel{6x^5} - 10x^4 - 2x^3 - \cancel{6x^5} = \boxed{-10x^4 - 2x^3}$$

$$\textcircled{1} \text{ Factor: } -8x^3 + 16x^2 \\ = -8x^2(x - 2)$$

$$\textcircled{2} \text{ Factor: } x^3 - 100x \\ = x(x^2 - 100) = x(x + 10)(x - 10)$$

$$\textcircled{3} \text{ Factor } x^3 - 5x^2 - 24x \\ = x(x^2 - 5x - 24) \\ = x(x + 3)(x - 8)$$

Solve by Zero-Factor Property:

$$1) (x - 7)(x + 10) = 0 \quad \{-10, 7\} \\ x - 7 = 0 \quad \text{OR} \quad x + 10 = 0 \\ \boxed{x = 7} \quad \boxed{x = -10}$$

$$2) (2x + 5)(5x - 2) = 0 \quad \left\{-\frac{5}{2}, \frac{2}{5}\right\} \\ 2x + 5 = 0 \quad \text{OR} \quad 5x - 2 = 0 \\ 2x = -5 \quad 5x = 2 \\ \boxed{x = -\frac{5}{2}} \quad \boxed{x = \frac{2}{5}}$$

$$3) x^2 - 8x + 16 = 0 \quad \text{Hint: Factor LHS First} \\ (x - 4)(x - 4) = 0 \quad \{4\} \\ x - 4 = 0 \quad \text{OR} \quad x - 4 = 0 \\ \boxed{x = 4} \quad \boxed{x = 4}$$

Solve & Graph:

$$2(x-1) - 4(x+1) \leq -10$$

$$\underline{2x} \quad \underline{-2} \quad \underline{-4x} \quad \underline{-4} \leq -10$$

$$-2x - 6 \leq -10$$

$$-2x \leq -10 + 6$$

$$-2x \leq -4$$

$$\frac{-2}{-2}x \geq \frac{-4}{-2}$$

$$x \geq 2$$

Interval notation $[2, \infty)$

SG 2

Look for due date & Availability Data

Class QZ 6

1) Convert $3x - 5y = 20$ in slope-Int form, then express in function notation.

$$-5y = -3x + 20$$

$$y = \frac{-3}{-5}x + \frac{20}{-5}$$

$$\rightarrow y = \frac{3}{5}x - 4$$

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

2) $f(x) = \frac{x-10}{x-1}$

Find

a) $f(0)$

$$= \frac{0-10}{0-1} = \frac{-10}{-1} = 10$$

b) $f(10)$

$$= \frac{10-10}{10-1} = \frac{0}{9} = 0$$

c) $f(1)$

$$= \frac{1-10}{1-1} = \frac{-9}{0} \text{ undefined}$$