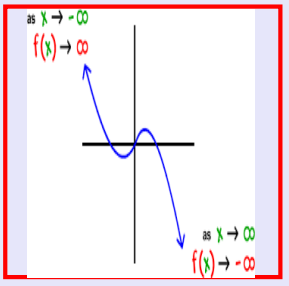
Math 245

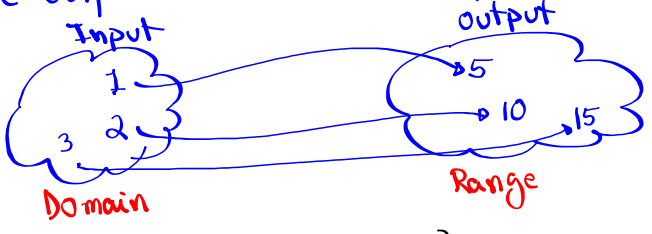
Spring 2022

Lecture 15



Intro to mathematical Functions:

A function takes input values and returns one output value for each input value.



$\{(1,5), (2,10), (3,15)\}$

Function is a set of ordered-pairs such that no x-value can have more than one y-value.

Input

Domain

output

Range

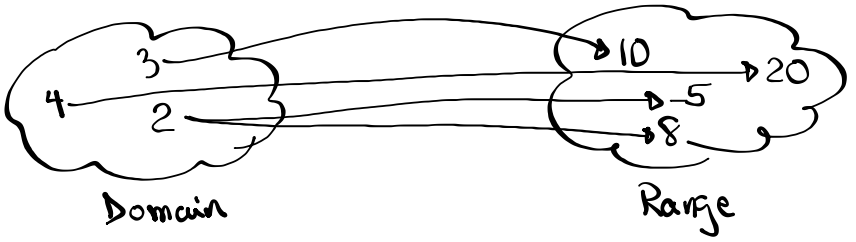
Consider the set below

$\{(3,10), (2,-5), (2,8), (4,20)\}$

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

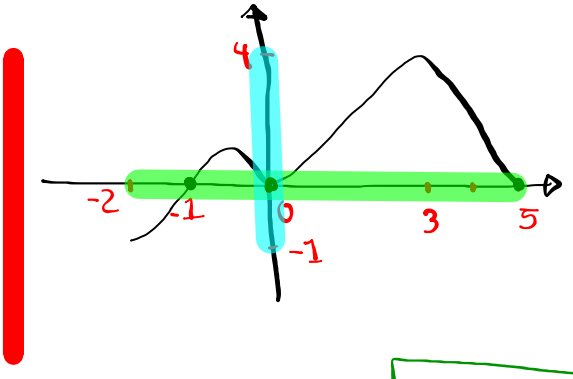
2) Range = $\{10, -5, 8, 20\}$

3)



4) Not a function. 2 has more than one output.
$(2,-5), (2,8)$

Consider the graph below



1) Domain: $[-2, 5]$

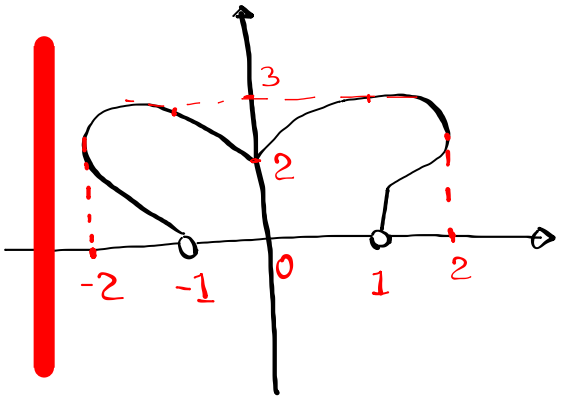
2) Range: $[-1, 4]$

3) Y-Int: $(0,0)$

4) X-Int: $(-1,0), (0,0), (5,0)$

5) It is a function by Vertical line test

Consider the graph below



1) Domain $[-2, 2]$

2) Range $(0, 3]$

3) Y-Int $(0, 2)$

4) x-Int None

5) Function or not? Explain

Not a Function ⇒ Because it Fails V.L.T.

Function notation $f(x)$ "f of x"

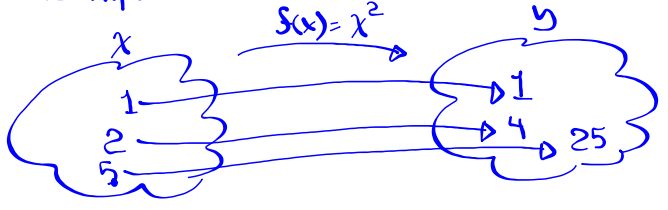
$g(x)$ "g of x"

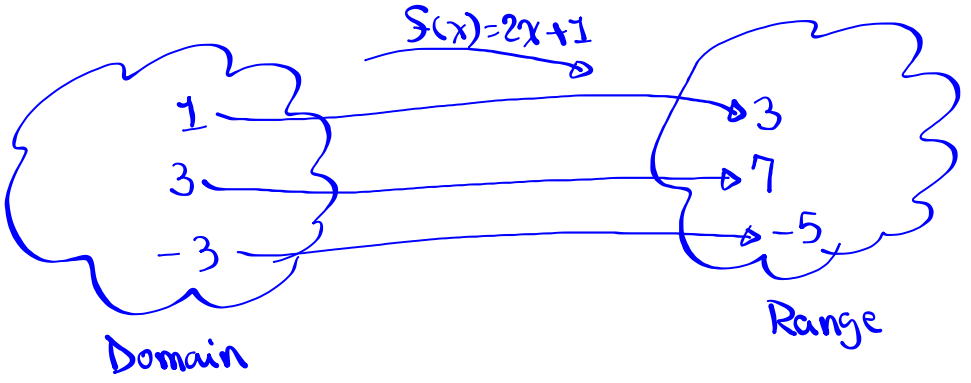
$h(x)$ "h of x"

$x \rightarrow$ Input (Domain) $\quad F(x) \rightarrow$ output (Range)

You can think of $f(x)$ as Y.

$f(x)$ is a formula or pattern that takes the input value and returns the output value.

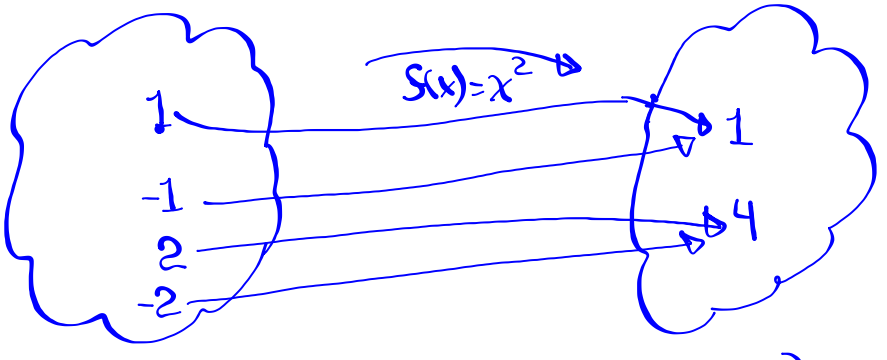




$f(1) = 2(1) + 1 = 2 + 1 = 3$

$f(3) = 2(3) + 1 = 6 + 1 = 7$

$f(-3) = 2(-3) + 1 = -6 + 1 = -5$



$\{(1,1), (-1,1), (2,4), (-2,4)\}$

$f(1) = 1^2 = 1$ $\qquad$ $f(-1) = (-1)^2 = 1$

$f(2) = 2^2 = 4$ $\qquad$ $f(-2) = (-2)^2 = 4$

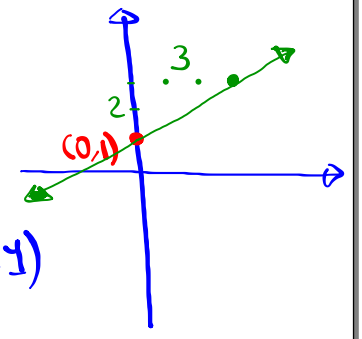
Given $y = \frac{2}{3}x + 1$

Slope - Int Form

$f(x) = \frac{2}{3}x + 1$

Linear Function

$m = \frac{2}{3}$, Y-Int $(0,1)$



Given $3x - 5y = 10$

1) write in Slope-Int. Form

$-5y = -3x + 10$

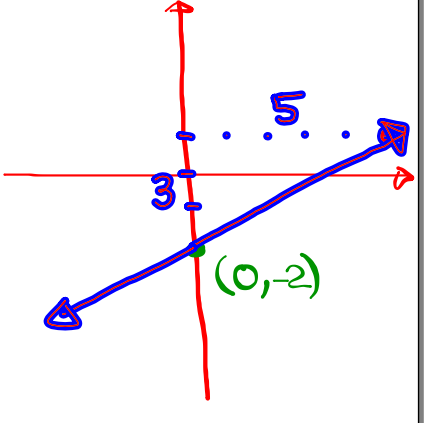
$y = \frac{-3}{-5}x + \frac{10}{-5}$

$y = \frac{3}{5}x - 2$

2) write in Function notation.

$f(x) = \frac{3}{5}x - 2$

Linear Function

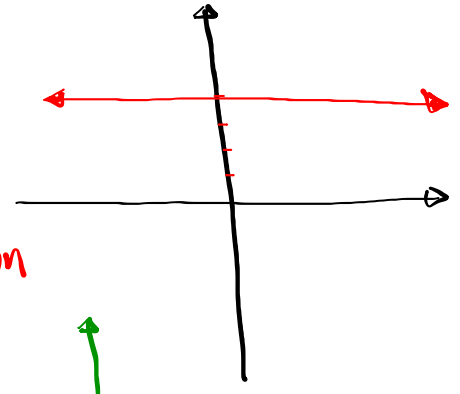


Graph $y=4$

Horizontal line

$f(x)=4$

Constant Function

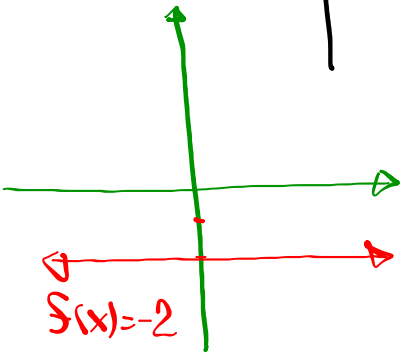


Graph $f(x)=-2$

Constant Function

$y=-2$

Horizontal line



Class QZ 6

Use Quadratic Formula to Solve

$x^2-2x-15=0.$

$a=1$

$b=-2$

$c=-15$

$b^2-4ac=(-2)^2-4(1)(-15)=4+60=64$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-(-2)\pm\sqrt{64}}{2(1)}=\frac{2\pm8}{2}$

$x=\frac{2+8}{2}=\frac{10}{2}=\boxed{5}$

$x=\frac{2-8}{2}=\frac{-6}{2}=\boxed{-3}$

$\{-3,5\}$