

4. Graphs.

If (f) is a function with domain (D), its graph consists of points in Cartesian plane whose coordinate are the input – output pairs for (f).

Example 1: Graph the function $y=x^2$

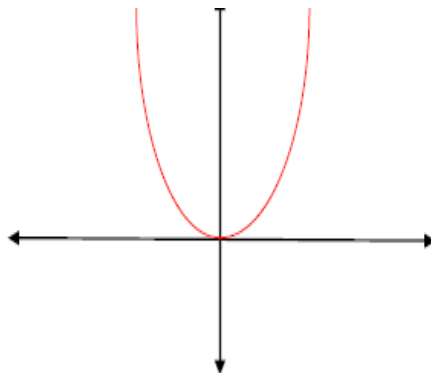
Solution//

1. Domain function =real number (R)

2. with x-axis $\rightarrow y=0 \rightarrow x^2=0 \rightarrow x=0 \rightarrow (0,0)$

With y-axis $\rightarrow x=0 \rightarrow y=0 \rightarrow (0,0)$

x	y= (x ²)
0	0
1	1
2	4
-1	1
-2	4



Example 2: graph the function $y=\frac{2+3X}{4+2X}$

Solution//

1. Domain $[4+2x=0 \rightarrow x = -2]$

Domain function=R except $\{-2\}$

2.with y- axis, $x=0 \rightarrow y=\frac{2+0}{4+0}$

$y=0.5, (0,0.5)$

with x- axis, $y=0 \rightarrow 0 = \frac{2+3X}{4+2X}$

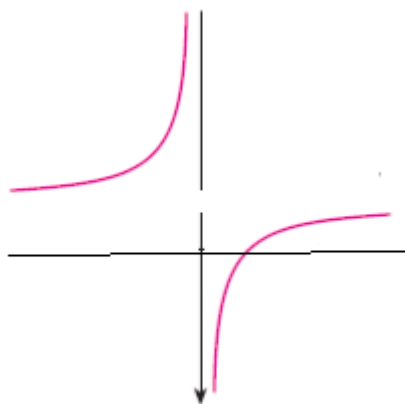
$2 + 3x = 0 \rightarrow x = -2/3. (-2/3.0)$

3. Vertical , $4+2x=0 \rightarrow x=-2$

4. Horizontal, $y=3/2$

5.

x	$y = \frac{2+3X}{4+2X}$
0	0.5
1	5/6
2	1
-1	-0.5



H.W. Example: graph the function

$y=(x+1)^2$

5. Function; Domain and range

Domain represents values of (x)

Range represents values of (y)

Example1: Find the domain and range of $y=x^2+1$

Solution//

Domain function=R or $-\infty \leq x \leq +\infty$

$y=x^2+1 \rightarrow x = \pm \sqrt{y - 1}$

Range function = $y \geq 1$

Example 2: Find the domain and range of $y = \frac{2x}{x-1}$

Solution//

$X-1=0 \rightarrow x=1 \rightarrow$ domain function = \mathbb{R} except $\{1\}$

$$y = \frac{2x}{x-1} \rightarrow yx - y = 2x$$

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

$$y-2=0 \rightarrow y = 2$$

Range function = \mathbb{R} except $\{2\}$

Example 3: Find the domain and range of $y = \frac{1}{x+1} - \frac{1}{x-1}$

Solution//

$X+1=0 \rightarrow x=-1$

$X-1=0 \rightarrow x = 1$

Domain function = \mathbb{R} except $\{-1, 1\}$

$$y = \frac{1}{x+1} - \frac{1}{x-1}$$

$$y = \frac{(x-1) - (x+1)}{(x+1)(x-1)}$$

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

$$yx^2 - y = -2$$

$$\rightarrow x = \frac{\sqrt{-2+y}}{\sqrt{y}}$$

$y > 0$ and $y \geq 2$

Range function= $y > 0 \cup y \geq 2$

Example 4: Find the domain and range of $y = \sqrt{\frac{x-1}{x+2}}$

Solution/

$$x-1 \geq 0 \rightarrow x \geq 1$$

$$x+2 \geq 0 \rightarrow x > -2$$

Domain function= $\{x: x \geq 1\} \cap \{x: x > -2\}$

$$y = \sqrt{\frac{x-1}{x+2}}$$

$$y^2 = \frac{x-1}{x+2} \rightarrow xy^2 + 2y^2 = x - 1$$

$$\rightarrow xy^2 - x = -1 - 2y^2$$

$$\rightarrow x = \frac{-1 - 2y^2}{y^2 - 1} \rightarrow y^2 - 1 = 0 \rightarrow y = \pm 1$$

Range function= \mathbb{R} except $\{+1, -1\}$

H.W. Example: Find the domain and range of $y = \frac{1}{\sqrt{4-x^2}}$