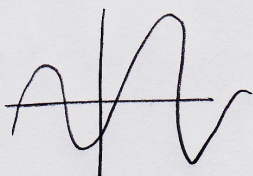


3.2 The Graph of a Function

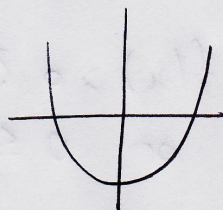
p.1

Vertical Line Test

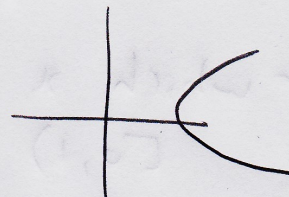
A set of points is the graph of a function if and only if every vertical line intersects the graph in at most 1 point.



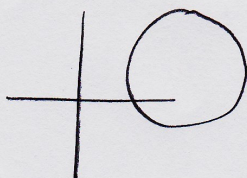
FUNCTION



FUNCTION

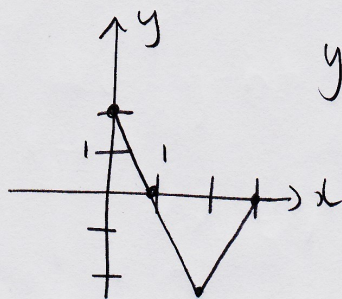


NOT A
FUNCTION



NOT A FUNCTION

Ex:



$$y = f(x)$$

a) Is f a function? Yes p. 2

b) Is $(2, -1)$ on graph? No

c) Find $f(2)$ $f(2) = -2$

d) If $x=3$, what is $f(x)$? $f(3) = 0$

e) For which x is $f(x) = 1$?

$$y=1 \Rightarrow x = -\frac{1}{2}$$

f) For which x is $f(x) > 0$?

$$[0, 1) \quad \text{or} \quad 0 \leq x < 1$$

g) Domain of f ?

$$(x\text{-values}) \quad [0, 3] \quad \text{or} \quad 0 \leq x \leq 3$$

h) Range of f ?

$$(y\text{-values}) \quad [-2, 2] \quad \text{or} \quad -2 \leq y \leq 2$$

i) Find all x -intercepts

$$x = 1, 3$$

$$(1, 0) \text{ and } (3, 0)$$

j) Find all y -intercepts

$$y = 2$$

$$(0, 2)$$

k) How often does the line $y = -1$ intersect the graph?
twice

Ex: $f(x) = \frac{x-2}{x+8}$

a) Is $(3, \frac{1}{11})$ on the graph?

$$f(3) = \frac{1}{11} \quad \boxed{\text{Yes}}$$

b) If $x=4$, what is $f(x)$?

$$f(4) = \frac{2}{12} = \frac{1}{6}$$

c) If $y=-9$, what is x ?

$$-9 = \frac{x-2}{x+8}$$

$$-9(x+8) = x-2$$

$$-9x - 72 = x - 2$$

$$-70 = 10x$$

$$x = -7$$

d) What is the domain of f ?

$$\{x \mid x \neq -8\}$$

e) Find the y -intercept(s)

(Set $x=0$)

$$f(0) = \frac{-2}{8} = -\frac{1}{4}$$

$$\boxed{(0, -\frac{1}{4})}$$

f) Find the x -intercept(s)

(Set $y=0$)

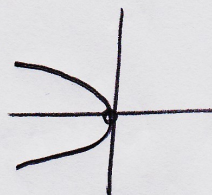
$$0 = \frac{x-2}{x+8}$$

$$0 = x - 2 \Rightarrow x = 2$$

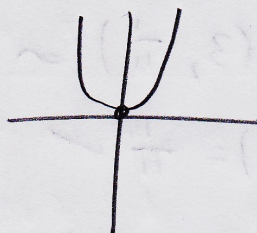
$$\boxed{(2, 0)}$$

Symmetry

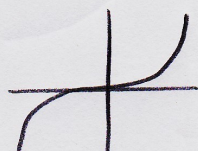
P.4



Symmetric with respect to x-axis



Symmetric with respect to y-axis



Symmetric with respect to origin

(unchanged when rotated 180°)