Pre-Calculus Sec. 1.2: Functions & Graphs

Relation: any ordered pairs. example: (x, y)

Domain: all first components or inputs (all x-values)

Range: all second components or outputs (all y-values)

Function: Each element in the domain (x's) corresponds to **exactly one** element in the range (y's)…… So….. x-values may not repeat! There can be only one y per x-value..

Function Notation: f(x), g(x), h(x), p(x), etc…..

Does the relation describe a function?

Mapping:

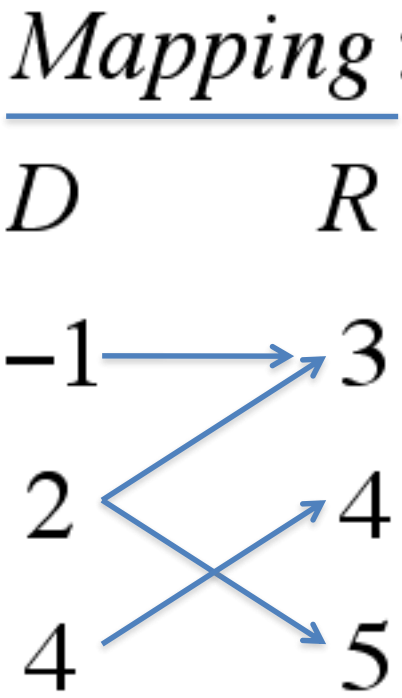


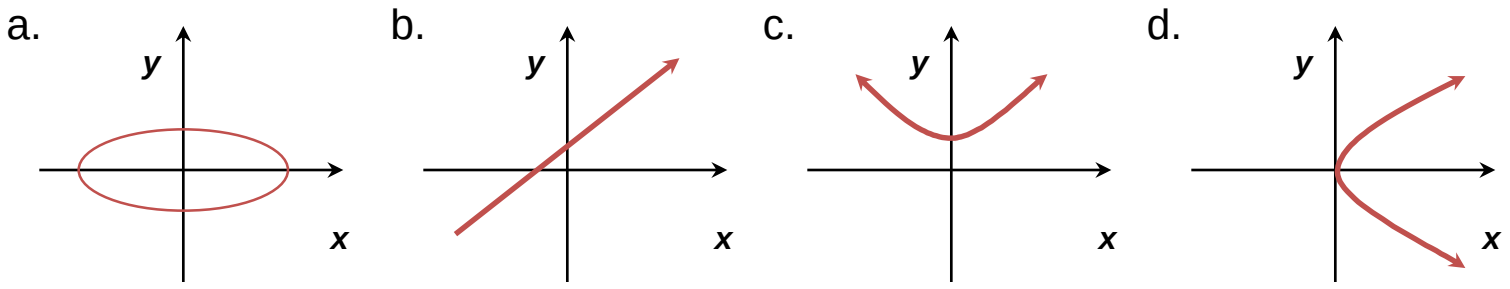
Table:

X	Y
2	3
−1	4
4	5

The Vertical Line Test for Functions

- If any vertical line intersects a graph in more than one point, the graph does not define y as a function.

Use the vertical line test to identify graphs in which ***y*** is a function of ***x***.



Determine whether the equation represents y as a function of x.

- Solve for y, if the equation is preceded by a

  $\pm$ this indicates that for a given value of x there corresponds 2 values of y. Plug in an x-value to test the number of y-values generated.

$$1)\ x = y^2 + 1$$

$$2)\ y = \sqrt{x+5}$$

3) $|y| = 4 - x$

Evaluate the functions as specified.

A) $f(x) = \sqrt{x+8} + 2$

$f(-8) =$

$f(1) =$

$f(x-8) =$

B)

$$g(x) = \begin{cases} 2x^2 - 1, & x \le 0 \\ 4x + 1, & x > 0 \end{cases}$$

$g(-1) =$

$g(4) =$

$g(0.25) =$

$c)\ f(x) = x^2 + 3\mathrm{x} + 5$

$f(x+3) =$

$d)\ g(x) = -x^2 + 2x$

$g(-5) =$

$g(-x) =$

PreCalculus Sec. 1.3 Piecewise Functions

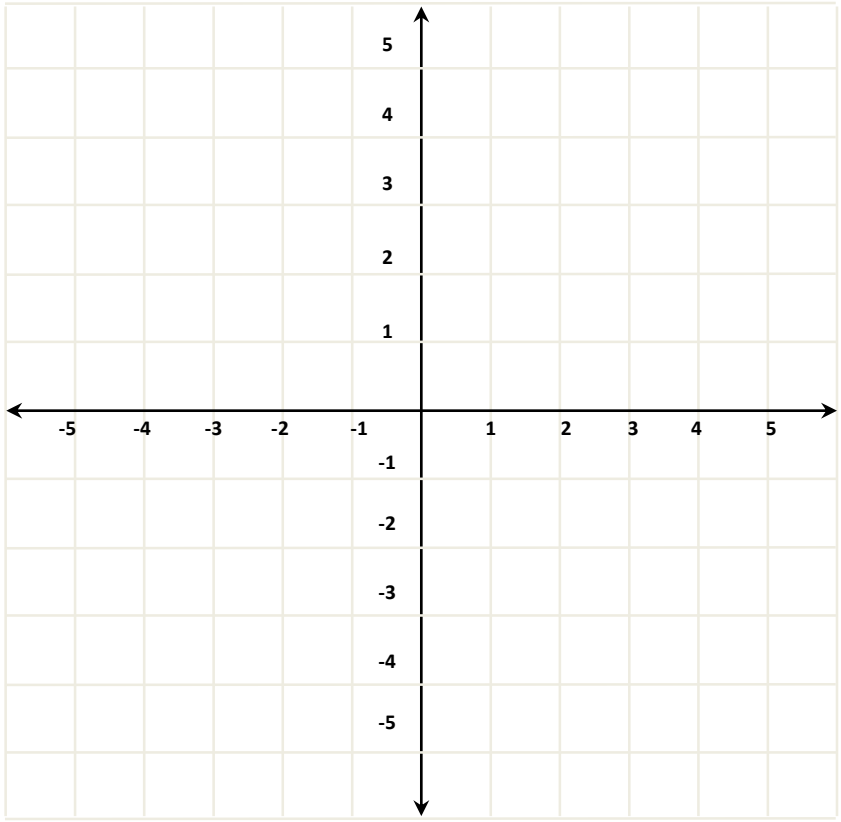
Definition of a Piecewise Function: A function that is defined by two (or more) equations over a specified domain is called a piecewise function.

Graphing Piecewise Functions:

1) Find the coordinates of the endpoints for each equation with the specific domain. Make a table for each "piece".
2) Sketch the shape of the graph for each equation by connecting its endpoints.
3) Plot a few extra points to obtain the shape if necessary.

Ex.2: Graph by hand. Make a **Table** for each piece.

$$a)\ f(x)=\begin{cases} x-1 & \text{if } x<0 \\ x^2-2x-3 & \text{if } 0\le x\le 3 \\ 0 & \text{if } x>3 \end{cases}$$



$$b) \quad f(x) = \begin{cases} x^2 & for\ x < 1 \\ 5 & for\ x = 1 \\ 1 - x & for\ x > 1 \end{cases}$$