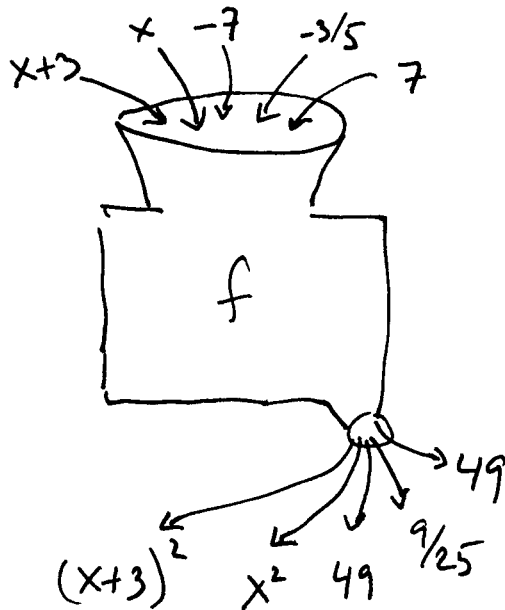


2.3 Functions

The Five Ways that Anyone Ever Thinks About Functions

Example: The squaring function.

① A machine that eats numbers



Note: The input determines the output.

② An equation in two variables

$$f(x) = x^2 \quad \text{so} \quad f(-3) = (-3)^2$$

$$f\left(\frac{5}{7}\right) = \frac{25}{49}$$

$$f(w+1) = (w+1)^2 = w^2 + 2w + 1$$

OR $y = x^2$

Note: The equation is solved for y .

(3) A table of ordered pairs

X	$X^2 = Y$
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9
4	16

OR

$$\{ (-3, 9), (-2, 4), (-1, 1), \dots, (4, 16) \dots \}$$

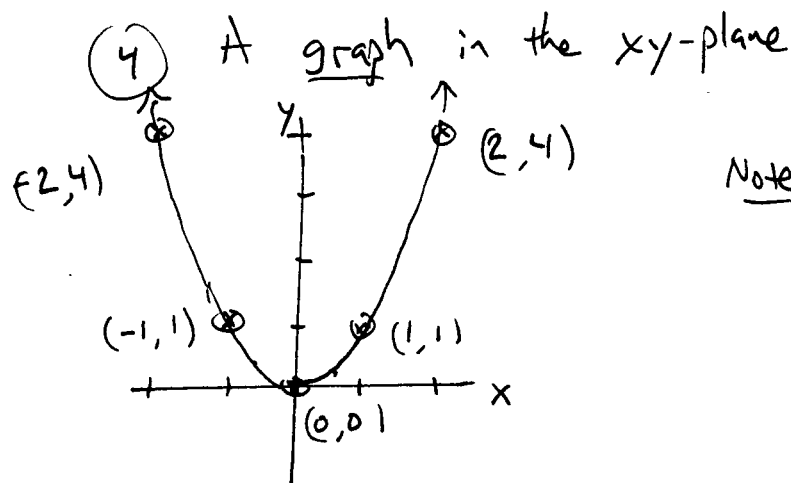
Note: There are no repeated numbers in the first column.

The domain

= numbers which can appear in 1st column

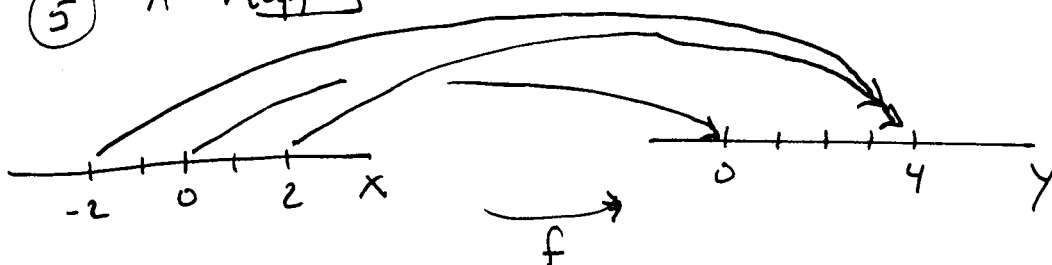
The range

= set of numbers which can appear in 2nd column



Note: The graph passes the vertical line test. That is, any vertical line crosses the graph at most once.

(5) A mapping from one number line to another.



Note: Arrows never split. (But they may converge.)