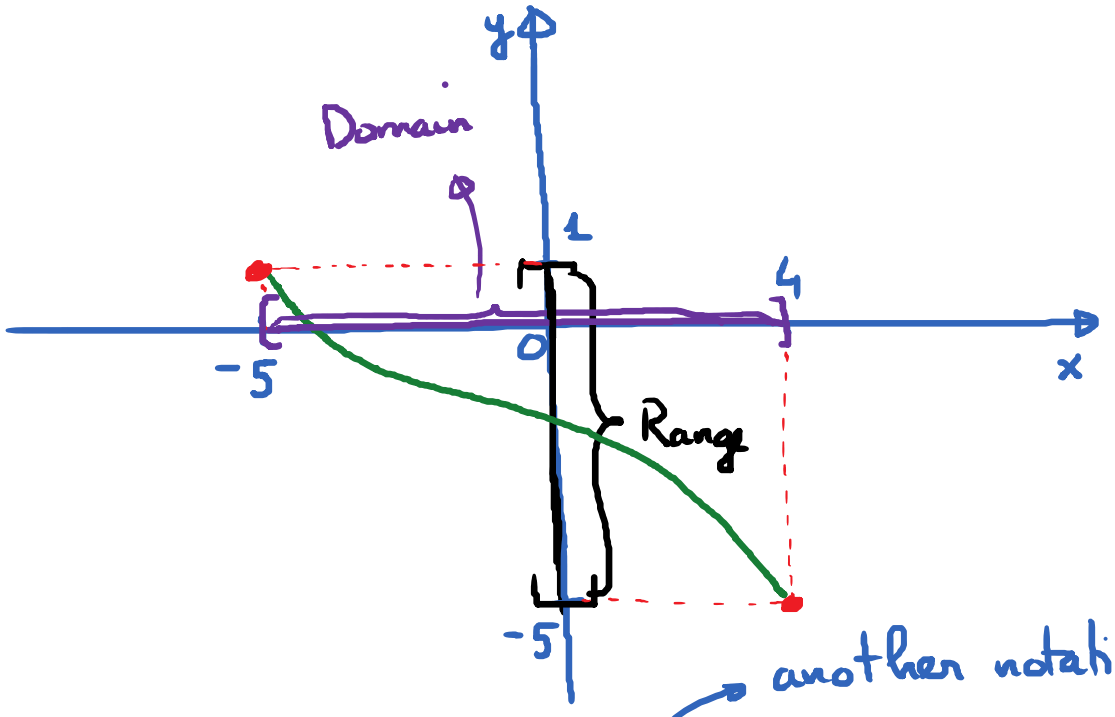
2.3. Finding Domain and Range

Tuesday, September 4, 2018 11:52 AM

Objectives : (1) Find Domain and Range of a function given its graph

(2) Find Domain of a function given its formula.

E.g.



another notation

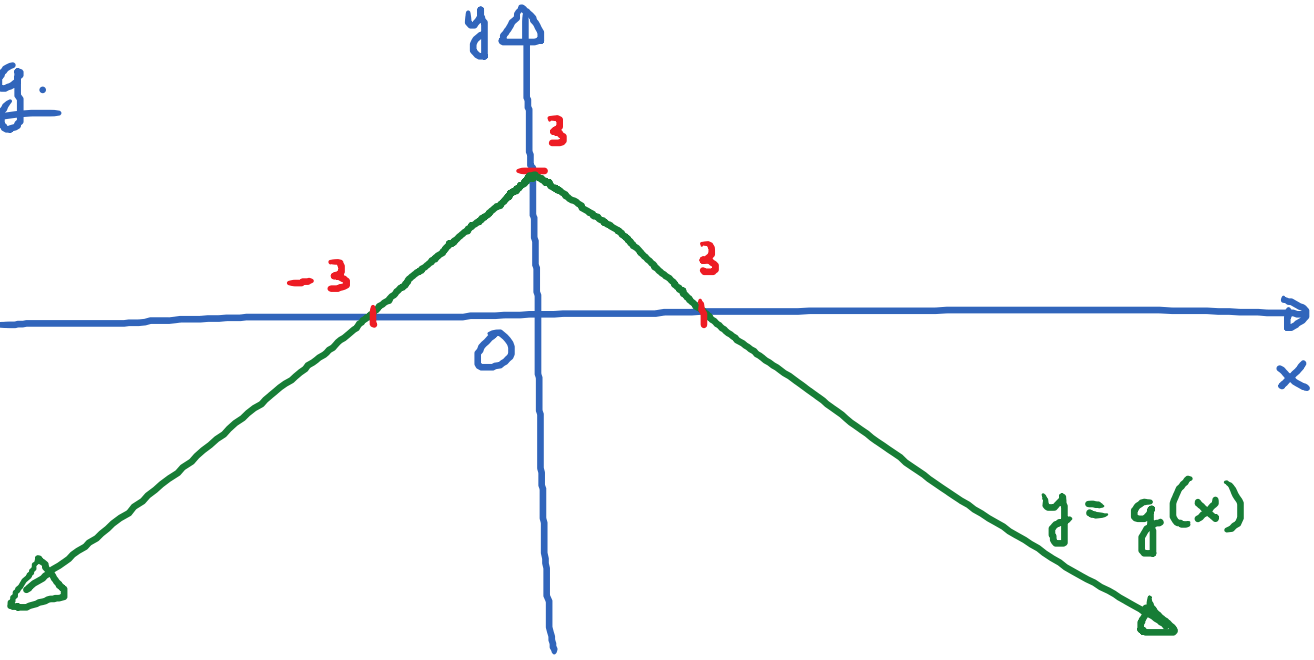
$$\text{Domain} \overset{?}{=} [-5, 4] = \{x \mid -5 \leq x \leq 4\}$$

$$\text{Range} \overset{?}{=} [-5, 1] = \{x \mid -5 \leq x \leq 1\}$$

Key. Domain = the set of all x-coordinates

Range = the set of all y-coordinates.

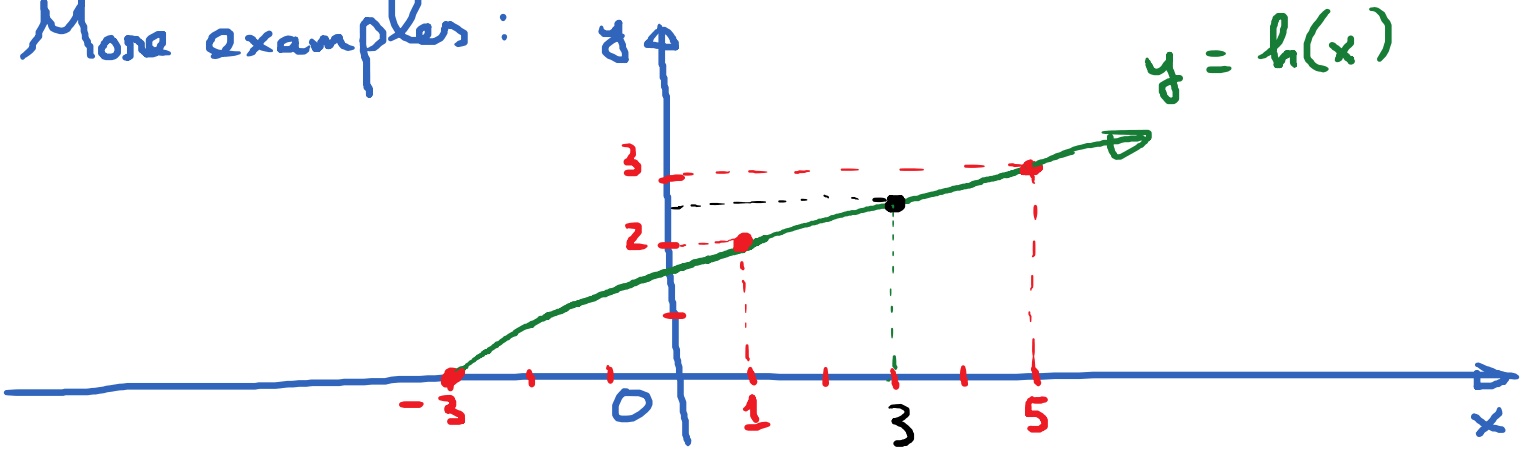
E.g.



Domain = $(-\infty, \infty)$ = All real numbers

Range = $(-\infty, 3]$ = $\{x \mid x \leq 3\}$

More examples:



* Domain $= [-3, \infty)$

  Range $= [0, \infty)$

* Find $h(1)$? $h(1) = 2$

  Find $h(3)$? $h(3) \approx 2.5$

  Find $h(-3)$? $h(-3) = 0$

* Find x such that $h(x) = 3$? Ans: $x = 5$

(2) Find domains given formulas:

$$f(x) = \frac{4x}{x-5}.$$

Find domain: All real #'s except for $x = 5$

because when $x = 5$, denominator $= 0$ and we cannot divide by zero.

$$D = (-\infty, 5) \cup (5, \infty)$$

Idea: Domain = set of permissible values of x.

To find the domain of a function of the form

$$f(x) = \frac{\text{Stuff 1}}{\text{Stuff 2}},$$ we set Stuff 2 = 0

Then we solve for all values of x for which Stuff $2 = 0$.

Domain = all real #'s except for those values that we just solved for.

E.g. $g(x) = \dfrac{8x-1}{2x+3}$

Find domain.

$2x+3 = 0$

$2x = -3$

$x = -\frac{3}{2}$.

Domain = All real #'s except for $x = -\frac{3}{2}$.

In interval notation:

$\left(-\infty, -\frac{3}{2}\right) \cup \left(-\frac{3}{2}, \infty\right)$