

Range of a Function

(1)

The range of f in Ex 4 is $\{1\}$ but the codomain $\{1, 2, 3, 4\}$. Note that $\{1\}$ is a subset of $\{1, 2, 3, 4\}$.

Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be given by

$$f(x) = x^2$$

Find the images of

$\{2, -5, \pi, 4^2, \frac{1}{\pi}, a+b\}$.

Soln:

$$f(2) = 2^2 = 4$$

$$f(-5) = (-5)^2 = 25$$

$$f(\pi) = \pi^2$$

$$f(4^2) = (4^2)^2 = 4^4 = 256.$$

$$f\left(\frac{1}{\pi}\right) = \frac{1}{\pi^2}$$

$$f(a+b) = (a+b)^2 = a^2 + 2ab + b^2.$$

$$f(\odot) = \odot^2$$

$f: \mathbb{R} \rightarrow \mathbb{R}$ be given by

$$f(x) = \sqrt{x} \quad \text{(Possible square root)} \quad (2)$$

Is f a function?

Soln:

$$x = -5$$

$$f(-5) = \sqrt{-5}$$

$$-5 \rightarrow \cdot$$

If we change our domain \mathbb{R} to $\mathbb{R}^+ \cup \{0\}$.

$g: \mathbb{R}^+ \cup \{0\} \rightarrow \mathbb{R}$. Then g is a function.

$$h: \mathbb{R} \rightarrow \mathbb{C}$$

$$f: \mathbb{R} \rightarrow \mathbb{R}$$

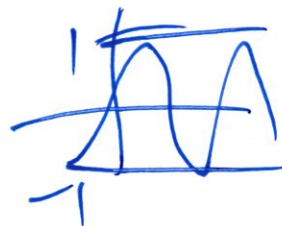
(a) $f(x) = x^3$ (b) $g(x) = \sin(x)$ (c) $h(x) = e^x$

Find the range in each case.

(a) \mathbb{R} .

(b) $[-1, 1]$

(c) \mathbb{R}^+ .



$$f: \mathbb{R} \rightarrow \mathbb{R}$$

$$f(x) = |x| = \begin{cases} x & \text{if } x \geq 0. \\ -x & \text{if } x < 0. \end{cases} \quad (3)$$

I_n

