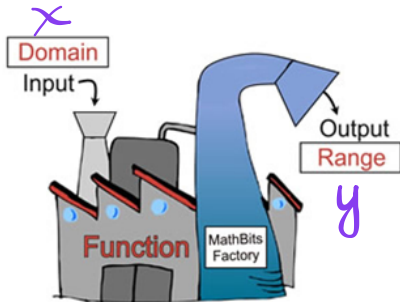


Recall:

A **function** is a set of ordered pairs in which each x -element has only ONE y -element associated with it → **each input has EXACTLY ONE output.**



✓ All of the values that can go into a relation or function (input) are called the domain.

✓ All of the values that come out of a relation or function (output) are called the range.

[Calculator Shortcut for Evaluating Functions → 2nd, TBLSET; Indpnt: ASK, ENTER.]

Evaluating Functions Examples:

1. If $f(x) = |x^3 - 3|$, then $f(-1)$ is equivalent to

- 1) 0
- 2) 2
- 3) -2
- 4) 4

$$f(-1) = |(-1)^3 - 3| = 4$$

2. If $f(x) = \frac{x}{x^2 - 16}$, what is the value of $f(-10)$?

- 1) $-\frac{5}{2}$
- 2) $-\frac{5}{42}$
- 3) $\frac{5}{58}$
- 4) $\frac{5}{18}$

$$f(-10) = \frac{-10}{(-10)^2 - 16} = -\frac{5}{42}$$

3. If $f(x) = \frac{x-4}{x+4}$, then $f(4a)$ equals

- 1) $\frac{a-1}{a+1}$
- 2) $\frac{a+1}{a-1}$
- 3) $\frac{4a-1}{4a+1}$
- 4) $\frac{4a+1}{4a-1}$

$$f(4a) = \frac{4a-4}{4a+4} = \frac{4(a-1)}{4(a+1)}$$

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4. Given $g(x) = 3x - 5$

find: $g(2)$ **1**

$g(-4)$ **-17**

$g(-3.78)$ **-16.34**

5. Given $f(x) = x^2 - 3x$

find: $f(3)$ **0**

$f(-1)$ **$(-1)^2 - 3(-1)$
4**

$f(4.1)$ **4.51**

Other notations you may see:

1. $f : x \rightarrow x + 3$

Function f pairs x with $x + 3$

2. $x \xrightarrow{f} x + 3$

Under function f , x maps to $x + 3$

3. $f = \{(x, y) | y = x + 3\}$

Function f is the ordered pairs (x, y) , such that $y = x + 3$

*4. $f(x) = x + 3$

f of x equals $x + 3$

*5. $y = x + 3$

y equals $x + 3$

Examples:

6. $x \xrightarrow{h} \frac{5+x}{x-2}$

$h(x) = \frac{5+x}{x-2}$

find $h(3)$ **8**

$h(-2)$ **$-\frac{3}{4}$**

$h(2)$ **undefined**

For 7-10, a) Write an expression for $f(x)$

b) find $f(4)$

c) find $f(-3)$

7. $x \xrightarrow{f} 3x - 4$

$$f(x) = 3x - 4$$

$$f(4) = 3(4) - 4 = \boxed{8}$$

$$f(-3) = 3(-3) - 4 = \boxed{-13}$$

8. $f = \{(x, y) \mid y = x^2 + 2\}$

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

$$f(4) = (4)^2 + 2 = \boxed{18}$$

$$f(-3) = (-3)^2 + 2 = \boxed{11}$$

9. $f: x \rightarrow |2x - 1|$

$$f(x) = |2x - 1|$$

$$f(4) = \boxed{7}$$

$$f(-3) = \boxed{7}$$

10. $y = 5$

$$f(x) = 5$$

$$f(4) = 5$$

$$f(-3) = 5$$

11. Answer the following questions about the function below:

$$\{(x, y) \mid 0 \leq x \leq 2 \text{ and } y = -4x^2 + 9\}$$

→ This set notation is an abbreviation for "The set of all points (x, y) such that x is an integer in the interval $0 \leq x \leq 2$ and the rule used to generate the function is $y = -4x^2 + 9$."

The equation can be rewritten in the form $y = f(x)$ where $f(x) = -4x^2 + 9$. What are the domain and range of the function f specified by the set?

i. Domain:

ii. Range: