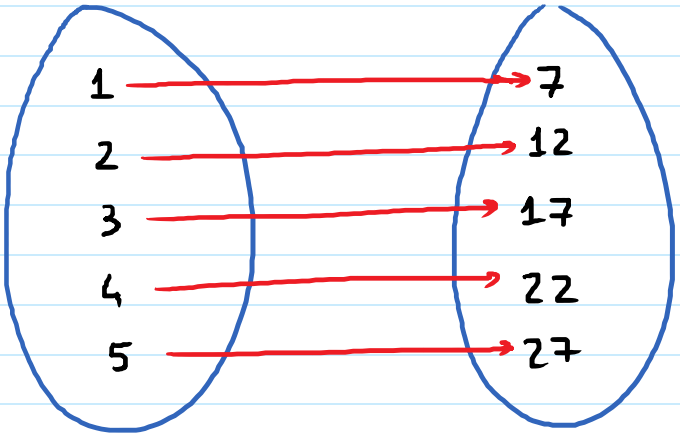


This is a function.

x = # of tickets ; y = cost of buying x tickets.

The equation $y = 5 \cdot x + 2$ gives us the cost of buying x tickets

This equation $y = 5x + 2$ defines a function.

dependent variable

independent variable

Note: Not all equations define a function.

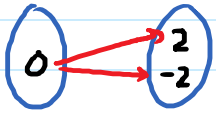
E.g. $x^2 + y^2 = 4$

$\rightarrow \quad y^2 = 4 - x^2$

$\rightarrow \quad y = \pm\sqrt{4 - x^2}$

This equation does NOT define y as a function of x. (Reason: if $x = 0$, then $y = \pm\sqrt{4} = \pm 2$.

So, one value of x corresponds to 2 values of y.



Note: If an equation is solved for y and more than one value of y can be obtained from a given value of x, then that equation does not define y as a function of x.

E.g. Solve each equation for y and determine whether the equation defines y as a function of x.

(a) $2x + y = 6$ (b) $x^2 + y^2 = 1$.

(a) $y = 6 - 2x$. This defines y as a function of x because for every value of x, we obtain exactly one value of y

(b) $y^2 = 1 - x^2 \rightarrow y = \pm\sqrt{1 - x^2}$

This does not define y as a function of x

Because for example, $x = 0$ corresponds to $y = \pm 1$.

Obj 3: Function Notation and Evaluate Functions.

When an equation defines y as a function of x, for example, $y = 5 \cdot x + 2$

We use function notation to describe it.

We name the function by the letter f (or $g, h, F, H, G, u, v, \ldots$)

We rewrite y as $f(x)$ (read as f of x)

$$y = 5 \cdot x + 2$$

is rewritten as:

$$f(x) = 5x + 2$$

x: input

f(x): output

Equation that tells us how to get the output from the input

Evaluate the function at 5:

$$f(5) = 5 \cdot (5) + 2 = 27$$

f of 5

Evaluate the function at 100

$$f(100) = 5 \cdot (100) + 2 = 502$$

f of 100

E.g. Evaluate a function.

$$f(x) = x^2 - 2x + 7$$

Evaluate each of the following: ⓐ $f(2)$. ⓑ $f(0)$ ⓒ $f(-1)$ ⓓ $f(-2)$

$f(x) = x^2 - 2x + 7$

$f(2) = (2)^2 - 2(2) + 7 = 4 - 4 + 7 = 7$

(f of 2 is equal to 7)

$f(0) = (0)^2 - 2(0) + 7 = 7$

$f(-1) = (-1)^2 - 2(-1) + 7$

$= 1 + 2 + 7 = 10$

$f(-2) = (-2)^2 - 2(-2) + 7$

$= 4 + 4 + 7 = 15$

Note: The input does not always have to be numbers.

$f(x) = x^2 - 2x + 7 = \square^2 - 2\square + 7$

Evaluate $f(\boxed{a})$

$f(a) = a^2 - 2a + 7$

Evaluate $f(a+1)$

$f(a+1) = (a+1)^2 - 2(a+1) + 7$

$= (a+1)(a+1) - 2a - 2 + 7$

$= a^2 + a + a + 1 - 2a - 2 + 7$

$= a^2 + 6$

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$f(x) = x^2 - 2x + 7 = \square^2 - 2\square + 7$

$f(\boxed{x+2}) \stackrel{?}{=}$

$= (x+2)^2 - 2(x+2) + 7$

$= (x+2)(x+2) - 2x - 4 + 7$

$= x^2 + 2x + 2x + 4 - 2x - 4 + 7$

$= \boxed{x^2 + 2x + 7}$