

Example 1: Determine a relationship between the x- and y-values. Write an equation.

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x	5	10	15	20
y	1	2	3	4

$$y = \frac{x}{5}$$

Example 2: Determine a relationship between the x- and y-values. Write an equation.

{(1, 3), (2, 6), (3, 9), (4, 12)}

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x	1	2	3	4
y	3	6	9	12

$$y = 3x$$

The **input** of a function is the independent variable.

The **output** of a function is the dependent variable.

Dependent Variable: a variable whose value depends on the value of the input

Independent Variable: A variable whose value determines the value of the output.

Example 3: Identify the independent and dependent variable in the situation.

a.) A painter must measure a room before deciding how much paint to buy.

Dependent variable: amount of paint

Independent variable: size of the room

b.) The height of a candle decreases d centimeters for every hour it burns.

Dependent variable: height of the candle

Independent variable: time (hours)

Try it!

A veterinarian must weigh an animal before determining the amount of medication.

Dependent variable: amount of medication

Independent variable: weight of the animal

To help you remember:

Independent Variable	Dependent Variable
x-values	y-values
Domain	Range
Input	Output
x	$f(x)$ or y

Function Rule - an algebraic expression that defines a function

Function Notation - $f(x) = 3x$
" f of x equals $3x$ " * $f(x)$ is not multiplication

So, the **dependent variable is a **function** of the **independent** variable.

We write that as: $y = f(x)$

Example 4: Identify the independent and dependent variable in the situation. Write an equation in function notation for the situation.

a.) A science tutor's fee is \$35 per hour.

Dependent variable: fee (\$)

Independent variable: hours (time)

$h = \# \text{ of hours}$

The function: $f(h) = 35h$

What would the total cost be for 4.5 hours of tutoring? \$157.50

$$\begin{aligned} f(h) &= 35h \\ f(4.5) &= 35(4.5) \\ f(4.5) &= 157.5 \end{aligned}$$

Try it!

A fitness center charges a \$100 initiation fee plus \$40 per month.

Dependent variable: total cost

Independent variable: # of months

$m = \# \text{ of months}$

The function: $f(m) = 100 + 40m$

How much would you spend after one year of membership at the gym? \$580

$$\begin{aligned} f(m) &= 100 + 40m && 12 \text{ months} \\ f(12) &= 100 + 40(12) \\ f(12) &= 100 + 480 \\ f(12) &= 580 \end{aligned}$$

Example 5: Evaluate the function for the given input values.

a.) For $f(x) = 3x + 2$, find $f(x)$ when $x = 7$ and when $x = -4$.

$$\begin{aligned} f(7) &= 3(7) + 2 \\ f(7) &= 21 + 2 \\ f(7) &= 23 \end{aligned}$$

$$\begin{aligned} f(-4) &= 3(-4) + 2 \\ f(-4) &= -12 + 2 \\ f(-4) &= -10 \end{aligned}$$

b.) For $g(t) = 15t - 5$, find $g(t)$ when $t = 6$ and when $t = -2$.

$$\begin{aligned} g(6) &= 15(6) - 5 \\ g(6) &= 90 - 5 \\ g(6) &= 85 \end{aligned}$$

$$\begin{aligned} g(-2) &= 15(-2) - 5 \\ g(-2) &= -30 - 5 \\ g(-2) &= -35 \end{aligned}$$

Try it!

1. For $h(c) = 2c - 1$, find $h(c)$ when $c = 1$ and when $c = -3$.

$$\begin{aligned} h(1) &= 2(1) - 1 \\ h(1) &= 2 - 1 \\ h(1) &= 1 \end{aligned}$$

$$\begin{aligned} h(-3) &= 2(-3) - 1 \\ h(-3) &= -6 - 1 \\ h(-3) &= -7 \end{aligned}$$

2. For $g(x) = 0.5x - 1$, find $g(x)$ when $x = 4$ and when $x = -3$.

$$\begin{aligned} g(4) &= 0.5(4) - 1 \\ g(4) &= 2 - 1 \\ g(4) &= 1 \end{aligned}$$

$$\begin{aligned} g(-3) &= 0.5(-3) - 1 \\ g(-3) &= -1.5 - 1 \\ g(-3) &= -2.5 \end{aligned}$$