

1-7 Function Notation

Starter 1.7 **HW 1.6???**

Evaluate.

- $5x - 2$ when $x = 4$ 18
- $3x^2 + 4x - 1$ when $x = 5$ 94
- $2x + 4\sqrt{x}$ when $x = 16$ 48
- $2 - t^2$ when $t = \frac{1}{2}$ $1\frac{3}{4}$
- Give the domain and range for this relation: $\{(1, 1), (-1, 1), (2, 4), (-2, 4), (-3, 9), (3, 9)\}$.
 D: $\{-3, -2, -1, 1, 2, 3\}$ R: $\{1, 4, 9\}$

1-7 Function Notation

Function Notation– the set of ordered pairs described by an equation

$$y = f(x)$$

Labels: **Output** (points to y), **Name of Function** (points to f), **Input** (points to x)

1-7 Function Notation

Function Notation– the set of ordered pairs described by an equation

Output value Input value

$$f(x) = 5x + 3$$

“ f of x equals 5 times x plus 3.”

$y = f(x)$
 “ y is in terms of x .”

Output value Input value

$$f(1) = 5(1) + 3$$

f of 1 equals 5 times 1 plus 3.

1-7 Function Notation

In the notation $f(x)$, f is the name of the function.

Caution
 $f(x)$ is NOT “ f times x ” or “ f multiplied by x .”
 $f(x)$ means “the value of f at x .” So $f(1)$ represents the value of f at $x=1$

1-7 Function Notation

Example 1: Evaluating Functions

For each function, evaluate $f(0)$, $f\left(\frac{1}{2}\right)$, and $f(-2)$.

$f(x) = 8 + 4x$

Substitute each value for x and evaluate.

$$f(0) = 8 + 4(0) = 8$$

$$f\left(\frac{1}{2}\right) = 8 + 4\left(\frac{1}{2}\right) = 10$$

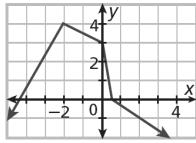
$$f(-2) = 8 + 4(-2) = 0$$

1-7 Function Notation

Example 1: Evaluating Functions

For each function, evaluate $f(0)$, $f\left(\frac{1}{2}\right)$, and $f(-2)$.

Use the graph to find the corresponding y -value for each x -value.



$$f(0) = 3$$

$$f\left(\frac{1}{2}\right) = 0$$

$$f(-2) = 4$$

1-7 Function Notation

Check It Out! Example 1a

For each function, evaluate $f(0)$, $f\left(\frac{1}{2}\right)$, and $f(-2)$.

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

$$f(0) = 0^2 - 4(0) = 0$$

$$f\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 - 4\left(\frac{1}{2}\right) = \frac{1}{4} - \frac{8}{4} = -\frac{7}{4}$$

$$f(-2) = (-2)^2 - 4(-2) = 4 + 8 = 12$$

1-7 Function Notation

Check It Out! Example 1b

For each function, evaluate $f(0)$, $f\left(\frac{1}{2}\right)$, and $f(-2)$.

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

$$f(0) = -2(0) + 1 = 1$$

$$f\left(\frac{1}{2}\right) = -2\left(\frac{1}{2}\right) + 1 = -1 + 1 = 0$$

$$f(-2) = -2(-2) + 1 = 4 + 1 = 5$$

1-7 Function Notation

In the notation $f(x)$, f is the name of the function.

Dependent Variable – the set of output values of $f(x)$

Independent Variable – the set of input values (x)

1-7 Function Notation

$$d(t) = 65t$$

Dependent variable Independent variable

1-7 Function Notation

Example 2A: Graphing Functions

Graph the function.

$\{(0, 4), (1, 5), (2, 6), (3, 7), (4, 8)\}$

Graph the points.

Do not connect the points because the values between the given points have not been defined.

1-7 Function Notation

Example 2B: Graphing Functions

Graph the function $f(x) = 3x - 1$.

Make a table.

x	$3x - 1$	$f(x)$
-1	$3(-1) - 1$	-4
0	$3(0) - 1$	-1
1	$3(1) - 1$	2

Graph the points.

Connect the points with a line because the function is defined for all real numbers.

1-7 Function Notation

Check It Out! Example 2a

Graph the function.

3	5	7	9
2	6	10	

Graph the points.

Do not connect the points because the values between the given points have not been defined.

1-7 Function Notation

Check It Out! Example 2b

Graph the function $f(x) = 2x + 1$.

Make a table.

x	$2x + 1$	$f(x)$
-1	$2(-1) + 1$	-1
0	$2(0) + 1$	1
1	$2(1) + 1$	3

Graph the points.

Connect the points with a line because the function is defined for all real numbers.

1-7 Function Notation

Example 3A: Entertainment Application

A carnival charges a \$5 entrance fee and \$2 per ride.

Write a function to represent the total cost after taking a certain number of rides.

Let r be the number of rides and let C be the total cost in dollars. The entrance fee is constant.

First, identify the independent and dependent variables.

Cost depends on the entrance fee plus the number of rides taken

Dependent variable Independent variable

Cost = entrance fee + number of rides taken

$C(r) = 5 + 2r$ *Replace the words with expressions.*

1-7 Function Notation

Example 3B: Entertainment Application

A carnival charges a \$5 entrance fee and \$2 per ride.

What is the value of the function for an input of 12, and what does it represent?

$C(12) = 5 + 2(12)$ *Substitute 12 for r and simplify.*

$C(12) = 29$

The value of the function for an input of 12 is 29. This means that it costs \$29 to enter the carnival and take 12 rides.

1-7 Function Notation

Check It Out! Example 3a

A local photo shop will develop and print the photos from a disposable camera for \$0.27 per print.

Write a function to represent the cost of photo processing.

Let x be the number of photos and let f be the total cost of the photo processing in dollars.

First, identify the independent and dependent variables.

Cost depends on the number of photos processed

Dependent variable Independent variable

Cost = $0.27 \times$ number of photos processed

$f(x) = 0.27x$ *Replace the words with expressions.*

1-7 Function Notation

Check It Out! Example 3b

A local photo shop will develop and print the photos from a disposable camera for \$0.27 per print.

What is the value of the function for an input of 24, and what does it represent?

$f(24) = 0.27(24)$ *Substitute 24 of x and simplify.*

$= 6.48$

The value of the function for an input of 24 is 6.48. This means that it costs \$6.48 to develop 24 photos.