Warm-Up | Function Notation

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Lesson Question	

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Lesson Goals

Interpret and apply ⬚.

Define the components of ⬚ notation.

Write functions to model ⬚.

Analyze ⬚ functions.

W2K
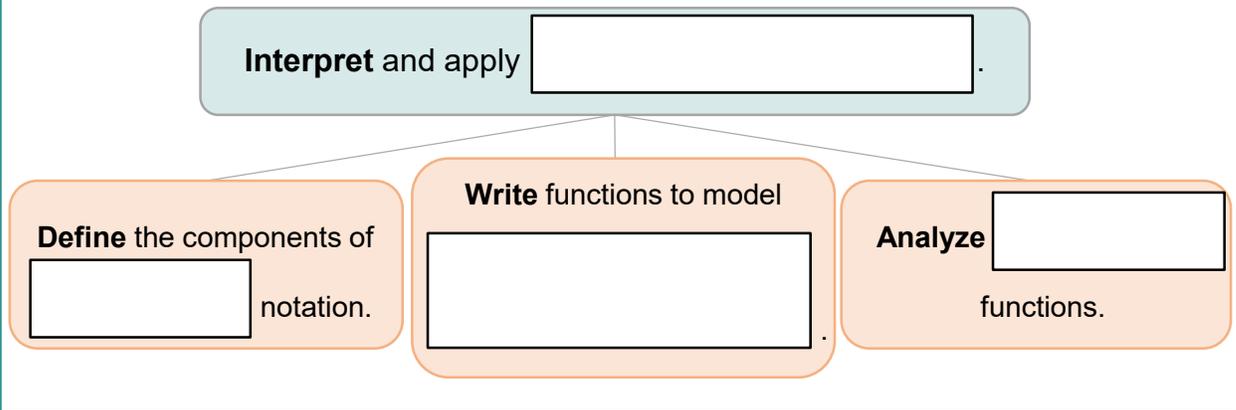
Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

	a relation in which each element of the domain is mapped to (paired with) exactly one element of the range
	the variable in a function that represents the output values; the second coordinate in the ordered pairs
	a graph that has a finite or limited number of data points
	a notation that traditionally replaces the dependent variable in a function with $f(x)$, where f represents the value of the dependent variable at a given independent value, x
	the variable in a function that represents the input values; the first coordinate in the ordered pairs
	a graph in the coordinate plane made up of connected lines or curves with no breaks

Warm-Up | Function Notation

Reviewing Functions

In a function, each value for the [____] variable ([____] values)

maps to exactly [____] for the dependent variables (output values).

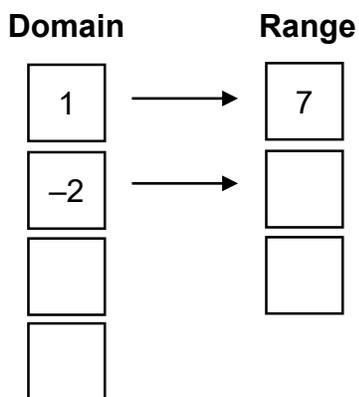## Reviewing Functions: Mapping Diagram

Step 1: Make a list of the domain (input) values.

Step 2: Use arrows to map each input value to its output value.

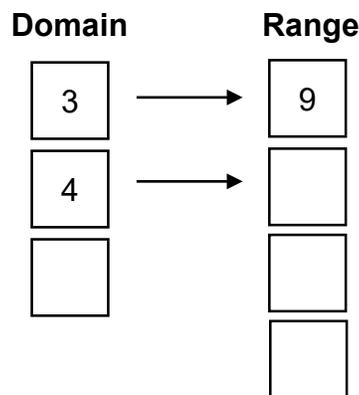*Fill in the blanks and draw arrows below to complete the mapping diagrams.*

Function	**Not a Function**
(1, 7), (–2, 0), (3, –3), (4, 7)	(3, 9), (4, –1), (3, 2), (0, –5)

Domain	Range	Domain	Range
1 →	7	3 →	9
–2 →		4 →	

Slide 2

Function Notation

The equation $y = 3x - 4$ can be written using function notation.

$$f(x) = \boxed{}$$

$$\boxed{}$$

output

Example: $2r = s + 1$, where s is the independent variable.

Step 1: Solve the equation.

$$\underline{2r} = \underline{s} + \underline{1}$$
$$\boxed{} \quad \boxed{} \boxed{}$$

Step 2: Write the equation in function notation.

$$f\left(\boxed{}\right) = \frac{1}{2}s + \frac{1}{2}$$

Slide 4

The Meaning of $f(x)$: **Common Misconceptions**

The meaning of $f(x)$ is

" $\boxed{}$ ".

The meaning of $f(x)$ is **not** "f times x."

What does $f(1) = 7$ mean?

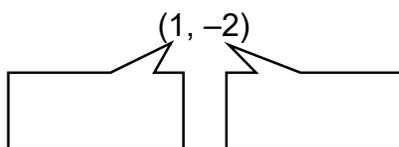The $\boxed{}$ of f is 7 when the $\boxed{}$ is 1.

Using Function Notation: Ordered Pairs
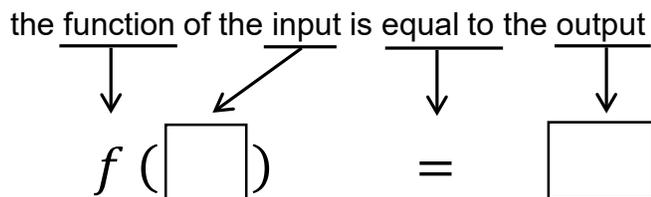
Example: (1, –2), (5, 0), (0, 3), and (3, 5)

How can the ordered pair (1, –2) be written using function notation?

Step 1: Identify the input and the output of the ordered pair.

(1, –2)

Step 2: Write the input and output in function notation.

the function of the input is equal to the output

$$f\left(\boxed{}\right) = \boxed{}$$

Example: (1, –2), (5, 0), (0, 3), and (3, 5)

What is $f(0)$?

Step 1: Identify the input.

The input is $\boxed{}$.

Step 2: Find an ordered pair with that input from the list above. *Circle that ordered pair.*

Step 3: Use the output of that ordered pair to complete the equation.

$$f(0) = \boxed{}$$

Instruction | Function Notation

Example: (1, –2), (5, 0), (0, 3), and (3, 5)

For what input does $f(x) = 5$?

Step 1: Identify the output.

The output is ⬚ .

Step 2: Find an ordered pair with that output from the list above. *Circle that ordered pair.*
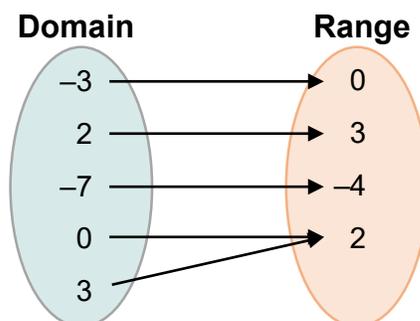
Step 3: Find the input of that ordered pair to answer the question.
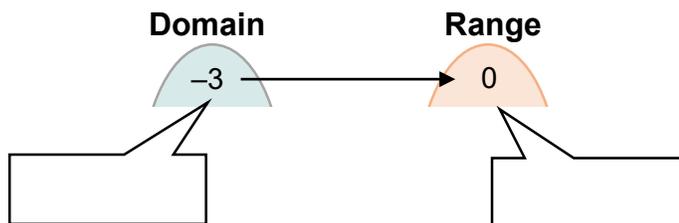
The input is ⬚ .

Using Function Notation: Mapping Diagram

Example: The mapping diagram shows a functional relationship.

Domain	Range
–3	0
2	3
–7	–4
0	2
3	

How can a domain value of –3 and corresponding range value of 0 be written using functional notation?

Step 1: Identify the input and the output of the mapping diagram.

Domain	Range
–3	0

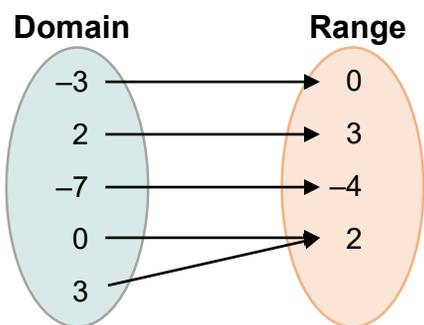⬚   ⬚

Instruction | Function Notation

Step 2: Write the input and output in function notation.

the function of the input is equal to the output

$$f\left(\quad\right) = \quad$$

Example: The mapping diagram shows a functional relationship.

What is $f(-7)$?

Domain   Range

−3 ⟶ 0
2 ⟶ 3
−7 ⟶ −4
0 ⟶ 2
3

Step 1: Identify the input.

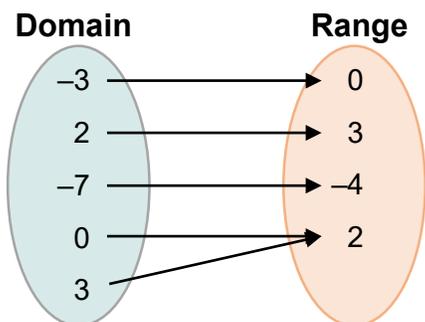The input is ⬚.

Step 2: In the mapping diagram, circle the arrow that maps this input to an output.

Step 3: Identify the output.

$f(-7) =$ ⬚

Example: The mapping diagram shows a functional relationship.

For what input value does $f(x) = 3$?

Domain   Range

−3 ⟶ 0
2 ⟶ 3
−7 ⟶ −4
0 ⟶ 2
3

Step 1: Identify the output.

The output is ⬚.

Step 2: In the mapping diagram, circle the arrow that maps an input to this output.

Step 3: Identify the input.

The input is ⬚.

Slide

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Using the Problem-Solving Process to Write a Function

REAL-WORLD CONNECTION

A tablet has 32 gigabytes of storage available, and each video download requires 2 gigabytes. The amount of storage left in gigabytes is represented by the variable s, and the number of videos downloaded is represented by the variable v.

Write a function that models the relationship between storage left and number of videos downloaded.

Question

Clues

Tablet → [ ]   Each video → [ ]

Strategy
The amount of storage [ ] on the number of videos downloaded.

Input variable → [ ]   Output variable → [ ]

Equation: [ ] $= 32 -$ [ ]   Function: [ ]

Check
5 videos → 22 GB
Check the function when the number of videos is 5:

[ ]

Instruction | Function Notation

Writing and Analyzing a Function

Example: An 8-inch candle burns at a rate of 0.5 inches every hour. Write a function that models the relationship between the height of the candle in inches as a function of the time t in hours.

Input: [　　　　] in [　　　　] → variable: t

Output: [　　　　] in [　　　　] → function notation: $h(t)$

The function $h(t) = 8 - 0.5t$ models the [　　　　] of a candle over [　　　　] t.

Are there any constraints on this graph of this function?

Time and height **cannot** be [　　　　].

Values can **only** be in the [　　　　] quadrant.

Will the graph of the function be a continuous graph or a discrete graph?

Time and height [　　　] have fractional values.

The graph is [　　　　].

Instruction | Function Notation
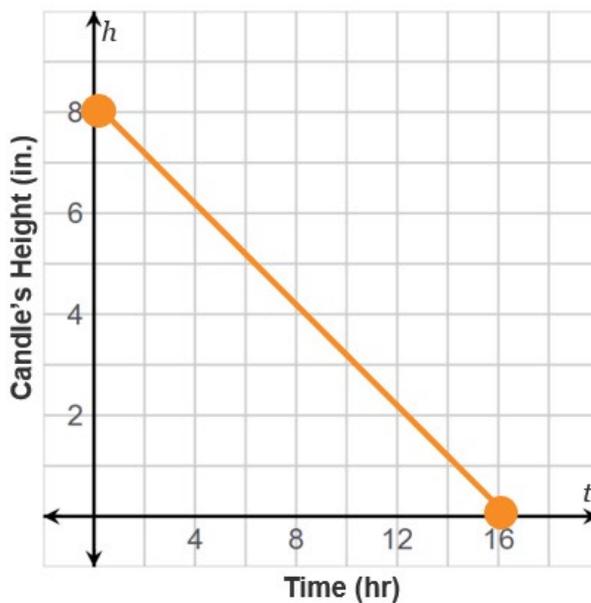
Writing and Analyzing a Function

At 0 hours, the height is ⬜ inches.

At ⬜ hours, the height is 0 inches.

What are the domain and range?

Domain: $\{t \mid \boxed{} \leq t \leq \boxed{}\}$

Range: $\{h(t) \mid \boxed{} \leq h(t) \leq \boxed{}\}$

Summary | Function Notation

Lesson Question: Why is function notation used?

Answer

Use this space to write any questions or thoughts about this lesson.