
ACT
PREP
MATH
K20
LEARN

Power Up: Math ACT Prep, Week 6

Function Notation

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Essential Question

How can I increase my ACT score?

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Learning Objectives

- Use function notation to simplify and evaluate functions.
- Perform operations using function notation.

Notation Exploration

- Work with a partner and use $f(x) = x^2 - 5$ to answer each of the questions on your handout.
- Answer each question in the order it was provided.

Notation Exploration (Solutions 1-5)

1) $f(3) = (3)^2 - 5 = \boxed{4}$

2) $f(-1) = (-1)^2 - 5 = \boxed{-4}$

3) $f(a) = (a)^2 - 5 = \boxed{a^2 - 5}$

4) $f(a+4) = (a+4)^2 - 5 = \boxed{a^2 + 8a + 11}$

5) $f(\bigstar) = \boxed{(\bigstar)^2 - 5}$

Notation Exploration (Solutions 6–10)

6) $f(\heartsuit) = (\heartsuit)^2 - 5$

7) $f(\text{  }) = (\text{  })^2 - 5$

8) $f(\text{  }) = (\text{  })^2 - 5$

9) $f(paper) = (paper)^2 - 5$

10) $f(g(x)) = (g(x))^2 - 5$

Notation Exploration: Simplifying

- Simplify question 10 for each of the following functions.

a) $g(x) = x + 3$

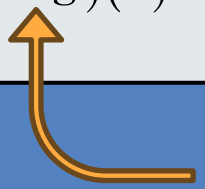
b) $g(x) = x^2 + 6$

c) $g(x) = \sqrt{x - 2}$

d) $g(x) = \frac{1}{x}$

Function Notation: Composition

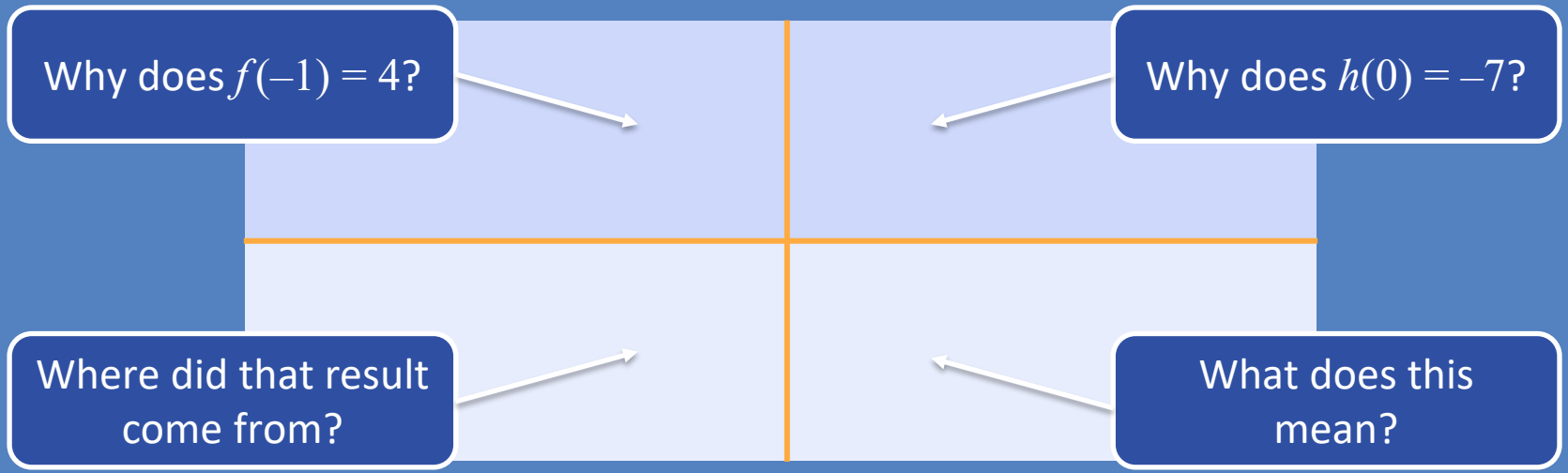
Algebraic (How to Write It)	Verbal (How to Read/Say It)
$(f \circ g)(x) = f(g(x))$	"f of g of x" " the composition of f of g"



composition operation

Function Notation: Making Observations

Use the given functions to see what you notice about the worked-out problems.



Function Notation: Verbalizing Observations

- Using academic vocabulary, do your best to describe what you observed.
  - Were there any patterns?
  - What was similar about the 4 problems?

Function Notation: Applying Observations

- Given functions $f(x) = 3x - 5$ and $g(x) = x^2 - 3$, what is the value of $f(g(-2))$?

Function Notation: Applying Observations

- Given functions $f(x) = 3x - 5$ and $g(x) = x^2 - 3$, what is the value of $f(g(-2))$?

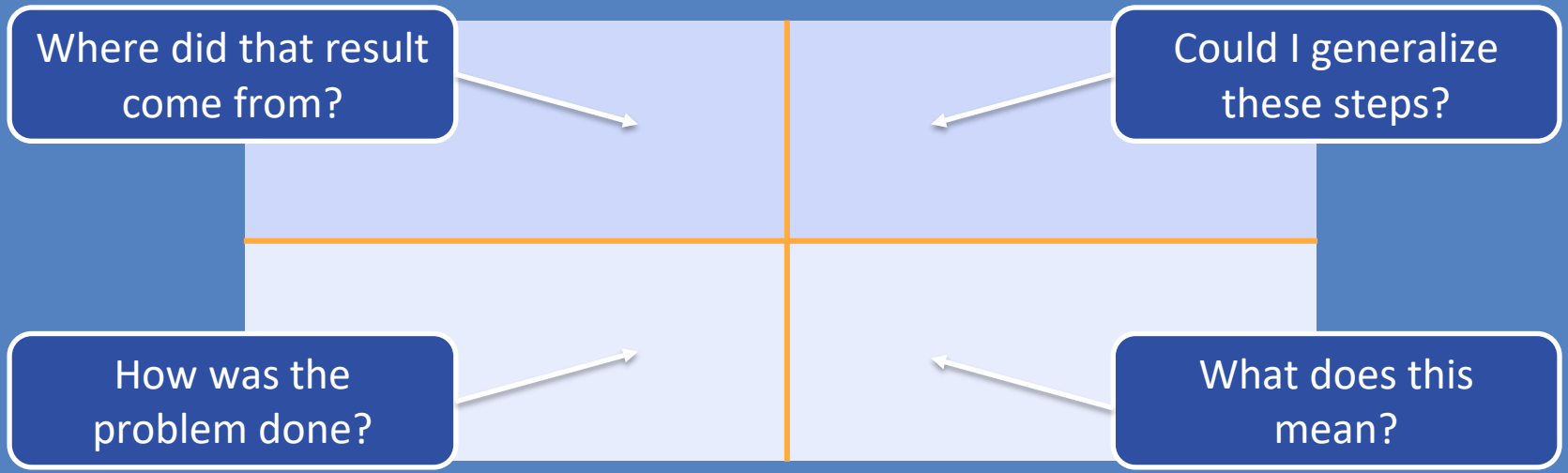
$$f\left(g\left(-2\right)\right) = f\left(\left(-2\right)^2 - 3\right)$$
$$= f\left(1\right)$$
$$= 3\left(1\right) - 5$$
$$= -2$$

Function Notation: Other Operations

Algebraic (How to Write It)	Verbal (How to Read/Say It)
$(f+g)(x)=f(x)+g(x)$	"f of x plus g of x" "the sum of f of g"
$(f-g)(x)=f(x)-g(x)$	"f of x minus g of x" "the difference of f of g"
$(fg)(x)=(f\cdot g)(x)=f(x)\cdot g(x)$	"f of x times g of x" "the product of f of g"

Function Notation: Making Observations

Use the given functions to see what you notice about the worked-out problems.



Function Notation: Verbalizing Observations

- Using academic vocabulary, do your best to describe what you observed.
  - Were there any patterns?
  - What was similar about the 4 problems?

Function Notation: Applying Observations

- Let the polynomial function f and g be defined as $f(x) = 2x^2 - 3x$ and $g(x) = x^2 - 3x + 4$.

  Let $h(x) = f(x) - g(x)$. What are all values of x for which $h(x) = 0$?

Function Notation: Applying Observations

- … $f(x) = 2x^2 - 3x$ and $g(x) = x^2 - 3x + 4$.

  Let $h(x) = f(x) - g(x)$. [*When does*] $h(x) = 0$?

$$h(x) = f(x) - g(x)$$
$$= (2x^2 - 3x) - (x^2 - 3x + 4)$$
$$= 2x^2 - 3x - x^2 + 3x - 4$$
$$= x^2 - 4$$

$$0 = x^2 - 4$$
$$4 = x^2$$
$$\pm 2 = x$$

Exit Ticket

Leave your paper face down until the timer starts.

2-Minute Timer

Exit Ticket (Answers)

1) B

2) G

Exit Ticket (Solution 1)

- A function, f, is defined by $f(x, y) = 2x - 3y^2$. What is the value of $f(2, 5)$?

$$f(x, y) = 2x - 3y^2$$

$$f(2, 5) = 2(2) - 3(5)^2$$

$$= 4 - 75$$

$$= \boxed{-71}$$

Exit Ticket (Solution 2)

- For all real numbers x and y, the operation $\otimes$ is defined by the rule $x \otimes y = x - 2y$. What is the value of $5 \otimes 4$?

$$x \otimes y = x - 2y$$

$$5 \otimes 4 = (5) - 2(4)$$

$$= 5 - 8$$

$$= \boxed{-3}$$

You Powered Up!

Achievement Unlocked:

Pacing

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