

READY, SET, GO!

Name

Date

READY

Topic: Using function notation

To evaluate an equation such as $y = 5x + 1$ when given a specific value for x , replace the variable x with the given value and work the problem to find the value of y .

Example: Find y when $x = 2$. Replace x with 2. $y = 5(2) + 1 = 10 + 1 = 11$.

Therefore, $y = 11$ when $x = 2$. The point $(2, 11)$ is one solution to the equation $y = 5x + 1$. Instead of using x and y in an equation, mathematicians often write $f(n) = 5n + 1$ because it can give more information. With this notation, the direction to find $f(2)$, means to replace the value of n with 2 and work the problem to find $f(n)$. The point $(n, f(n))$ is in the same location on the graph as (x, y) , where n describes the location along the x -axis, and $f(n)$ is the height of the graph.

Given that $f(n) = 8n - 3$ and $g(n) = 3n - 10$, find the following function values.

1. $f(5) =$ 2. $g(5) =$ 3. $f(-4) =$ 4. $g(-4) =$

5. $f(0) =$ 6. $g(0) =$ 7. $f(1) =$ 8. $g(1) =$

Topic: Looking for patterns of change

Complete each table by looking for the pattern.

9.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	2	4	8	16	32			

10.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	66	50	34	18				

11.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	160	80	40	20				

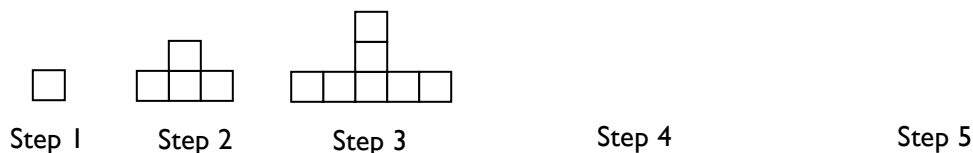
12.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	-9	-2	5	12				

SET

Topic: Use variables to create equations that connect with visual patterns.

In the pictures below, each square represents one tile.



13. Draw Step 4 and Step 5.

The students in a class were asked to find the number of tiles in a figure by describing how they saw the pattern of tiles changing at each step. Match each student’s way of describing the pattern with the appropriate equation below. Note that “s” represents the step number and “n” represents the number of tiles.

(a) $n = (2s - 1) + (s - 1)$

(b) $n = 3s - 2$

(c) $n = s + 2(s - 1)$

14. ___ Dan explained that the middle “tower” is always the same as the step number. He also pointed out that the 2 arms on each side of the “tower” contain one less block than the step number.

15. ___ Sally counted the number of tiles at each step and made a table. She explained that the number of tiles in each figure was always 3 times the step number minus 2.

step number	1	2	3	4	5	6
number of tiles	1	4	7	10	13	16

16. ___ Nancy focused on the number of blocks in the base compared to the number of blocks above the base. She said the number of base blocks were the odd numbers starting at 1. And the number of tiles above the base followed the pattern 0, 1, 2, 3, 4. She organized her work in the table at the right.

Step number	# in base + #on top
1	1 + 0
2	3 + 1
3	5 + 2
4	7 + 3
5	9 + 4

GO

Topic: The Meaning of an Exponent

Write each expression using an exponent.

17. $6 \times 6 \times 6 \times 6 \times 6$

18. $4 \times 4 \times 4$

19. $15 \times 15 \times 15 \times 15$

20. $\frac{1}{3} \times \frac{1}{3}$

A) Write each expression in expanded form. B) Then calculate the value of the expression.

21. 7^1

22. 3^2

23. 5^3

24. 10^4

25. $7(2)^3$

26. $10(8^2)$

27. $3(5)^4$

28. $16\left(\frac{1}{2}\right)^3$

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READY

Topic: Interpreting function notation

A) Use the given table to identify the indicated value for n . B) Then using the value for n that you determined in A, use the table to find the indicated value for B.

n	1	2	3	4	5	6	7	8	9	10
$f(n)$	-8	-3	2	7	12	17	22	27	32	37

- A) When $f(n) = 12$, what is the value of n ?
B) What is the value of $f(n - 1)$?
- A) When $f(n) = 17$, what is the value of n ?
B) What is the value of $f(n - 1)$?
- A) When $f(n) = 32$, what is the value of n ?
B) What is the value of $f(n + 1)$?

- A) When $f(n) = 2$, what is the value of n ?
B) What is the value of $f(n + 3)$?
- A) When $f(n) = 27$, what is the value of n ?
B) What is the value of $f(n - 6)$?
- A) When $f(n) = -8$, what is the value of n ?
B) What is the value of $f(n + 9)$?

SET

Topic: Comparing explicit and recursive equations

Use the given information to decide which equation will be the easiest to use to find the indicated value. Find the value and explain your choice.

<p>7. Explicit equation: $y = 3x + 7$ Recursive: $now = previous\ term + 3$</p> <table border="1" style="width: 100%;"> <tr> <td>term #</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>value</td> <td>10</td> <td>13</td> <td>16</td> <td></td> </tr> </table> <p>Find the value of the 4th term. _____ Explanation:</p>	term #	1	2	3	4	value	10	13	16		<p>8. Explicit equation: $y = 3x + 7$ Recursive: $now = previous\ term + 3$</p> <table border="1" style="width: 100%;"> <tr> <td>term #</td> <td>1</td> <td>2</td> <td>...</td> <td>50</td> </tr> <tr> <td>value</td> <td>10</td> <td>13</td> <td>...</td> <td></td> </tr> </table> <p>Find the value of the 50th term. _____ Explanation:</p>	term #	1	2	...	50	value	10	13	...	
term #	1	2	3	4																	
value	10	13	16																		
term #	1	2	...	50																	
value	10	13	...																		

<p>9. The value of the 8th term is 78. The sequence is increasing by 10 at each step.</p> <p>Explicit equation: $y = 10x - 2$ Recursive: $now = previous\ term + 10$</p> <p>Find the 20th term. _____ Explanation:</p>	<p>10. The value of the 8th term is 78. The sequence is increasing by 10 at each step.</p> <p>Explicit equation: $y = 10x - 2$ Recursive: $now = previous\ term + 10$</p> <p>Find the 9th term. _____ Explanation:</p>
<p>11. The value of the 4th term is 80. The sequence is being doubled at each step.</p> <p>Explicit equation: $y = 5(2^x)$ Recursive: $now = previous\ term * 2$</p> <p>Find the value of the 5th term. _____ Explanation:</p>	<p>12. The value of the 4th term is 80. The sequence is being doubled at each step.</p> <p>Explicit equation: $y = 5(2^x)$ Recursive: $now = previous\ term * 2$</p> <p>Find the value of the 7th term. _____ Explanation:</p>

GO

Topic: Evaluating Exponential Equations

Evaluate the following equations when $x = \{ 1, 2, 3, 4, 5 \}$. Organize your inputs and outputs into a table of values for each equation. Let x be the input and y be the output.

13. $y = 4^x$

14. $y = (-3)^x$

15. $y = -3^x$

16. $y = 10^x$

x <i>input</i>	y <i>output</i>
1	
2	
3	
4	
5	

x <i>input</i>	y <i>output</i>
1	
2	
3	
4	
5	

x <i>input</i>	y <i>output</i>
1	
2	
3	
4	
5	

x <i>input</i>	y <i>output</i>
1	
2	
3	
4	
5	

17. If $f(n) = 5^n$, what is the value of $f(4)$?