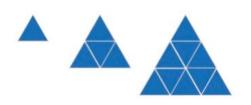
Geometric Sequences

Write and explicit rule that describes the number of items used to construct the pattern in terms of the term number, *n*.

1.



SOLUTION:

The first one has 1 block.

The second one has 4 blocks.

The third one has 9 blocks.

1, 4, 9, ... the number of blocks is equal to $n^2 \,$

ANSWER:

 n^2

For questions 7 and 8, use the following situation.

Science

Roger dropped a ball from a height of 1000 centimeters. The height of the ball is 80% of the previous height after each bounce of the ball. Roger can create a geometric sequence that shows the height of the ball at the end of each bounce.

800, 640, 512, 409.6, ...

7. What is the height of the ball after the 5th bounce?

SOLUTION:

"The height of the ball is 80% of the previous height after each bounce of the ball." Therefore, to get the next height, multiply the previous height by 80%.

409.6 is height #4, so to get height #5, multiply 409.6 by 80%

409.6 * .8 = 327.68 centimeters

ANSWER:

327.68 centimeters

Write a function rule that describes the height of the ball, *f*(*n*), after the number of bounces, *n*, the ball makes.

SOLUTION:

$$a_1 = 800, r = 0.8$$

 $f(n) = a_1 * r^{n-1}$
 $f(n) = 800 * 0.8^{n-1}$
ANSWER:
 $f(n) = 800 * 0.8^{n-1}$

Write a recursive rule and an explicit rule.

12. 2, 6, 18, 54, 162, ...

SOLUTION:

Recursive: each number results from multiplying 3 to the previous number, and the first number, $a_1 = 2$. So, $a_n = 3a_{n-1}$.

Explicit: the difference between each number is 3, but the first number is 2. So, $a_n = 2 * 3^{n-1}$,

ANSWER:

Recursive: $a_1 = 2$; $a_n = 3a_{n-1}$

Explicit:
$$a_n = 2 * 3^{n-1}$$

14. 1.5, 7.5, 37.5, 187.5, ...

SOLUTION:

Recursive: each number results from multiplying 5 to the previous number, and the first number, $a_1 = 1.5$. So, $a_n = 5a_{n-1}$.

Explicit: the difference between each number is 5, but the first number is 1.5. So, $a_n = 1.5 * 5^{n-1}$.

ANSWER:

Recursive: $a_1 = 1.5$; $a_n = 5a_{n-1}$ Explicit: $a_n = 1.5 * 5^{n-1}$ 15. 64, 16, 4, 1, 0.25, ...

SOLUTION:

Recursive: each number results from dividing 4 into the previous number, and the first number, $a_1 = 64$. So, $a_n = \frac{1}{4}a_{n-1}$.

Explicit: the difference between each number is $\frac{1}{4}$, but the first number is 64. So, $a_n = 64 * (\frac{1}{4})^{n-1}$.

ANSWER:

Recursive: $a_1 = 64$; $a_n = \frac{1}{4}a_{n-1}$. Explicit: $a_n = 64 * (\frac{1}{4})^{n-1}$

For each recursive and explicit rule given below, write the first 4 terms in the sequence.

18. $a_1 = 3$; $a_n = 4a_{n-1}$ $a_n = 3 * 4^{n-1}$ SOLUTION: $a_1 = 3$, and the common ratio is 4, so 3*4 = 12, 12*4 = 48, 48*4 = 192ANSWER: 3, 12, 48, 192

19. $a_1 = 625; a_n = \frac{1}{5} a_{n-1}$ $a_n = 625 * (\frac{1}{5})^{n-1}$ SOLUTION: $a_1 = 625$, and the common ratio is $\frac{1}{5}$, so $625 * \frac{1}{5} = 125$, $125 * \frac{1}{5} = 25$, $25 * \frac{1}{5} = 5$ ANSWER:

625, 125, 25, 5