Bell Work

Identify the pattern. Then find the next term in the sequence.

1. 4, 8, 16, 32, ..64
   x2 x2 x2
2. 5, 15, 45, 135, ...405
   x3 x3 x3
3. 81, 27, 9, 3, 1, ...$\frac{1}{3}$
   x$\frac{1}{3}$ x$\frac{1}{3}$
4. -4, 16, -64, 256, ...1024
   x-4

$4(2)^{n-1}$

When you are finished, try to write a rule for the nth term. Do you notice a pattern?

Apr 1-8:23 AM

(21) 1, 1.25, 1.50, ...

$S_{25} = \frac{25(1+7)}{2}$

$= \$100$

$a_n = a_1 + (n-1)d$

$a_{25} = 1 + (25-1)(.25)$

$= 1 + 24(.25)$

$= 1 + 6$

$= 7$

Apr 8-9:30 AM

GEOMETRIC SEQUENCE

4-8-15

Arithmetic + or −

Geometric × 2, 4, 8, 16, 32, ...

A *geometric sequence* is a sequence that has a common ratio, r, which is ***MULTIPLIED*** by a term to get the next term.

$a_n = a_1(r)^{n-1}$ $r = \frac{2nd}{1st} = \frac{3rd}{2nd}$

Apr 1-8:33 AM

Decide whether the sequence is arithmetic, geometric or neither.

$\frac{8}{2}=4$ $\frac{32}{8}=4$

(a) 2, 8, 32, 128, ... Geo

$\frac{4}{1}=4$ $\frac{9}{4}=$

(b) 1, 4, 9, 16, ... Neither

$\frac{-6}{3}=2$ $\frac{-18}{6}=-3$

(c) -3, 6, -18, 54, ... Neither

(d) 5/3, 7/3, 8/3, ... Arith

+1/3 +1/3

(e) -4, 4, -5, -5, ... Neither

$\frac{4}{-4}=-1$ $\frac{5}{4}$

Apr 1-8:33 AM

Find a term in the sequence

Find the given term for each geometric sequence.

$a_n = a_1 \cdot (r)^{n-1}$

a_n - nth term (what you are looking for)

a_1 - the first term in the sequence

r - ratio

n - total number of terms

Examples:

(a) 4, 8, 16, 32, ...; 7th term ___ $\times 2$ $\times 2$ 64 128 (256) $4(2)^{7-1}$ $4(2)^6$

(b) -3, 3, -3, 3, ...; 8th term ___ $r=-1$ -3 3 -3 (3) $-3(-1)^7$

(c) 256, 64, 16, 4, 1, 1/4, 1/16, ...; 10th term ___ $r=\frac{64}{256}=\frac{1}{4}$ $\frac{1}{64}$ $\frac{1}{256}$ $\frac{1}{1024}$ $\frac{1}{4096}$ $256\left(\frac{1}{4}\right)^9$

$=\frac{16}{64}=\frac{1}{4}$

Apr 10-3:24 PM

Sequence Strips Activity

- Get into groups of 2.
- Each group needs one envelope with sequence strips and one piece of paper.

GOAL: Organize the strips into three groups. (Arithmetic, Geometric and Neither)

- After organize find the rule that applies to each strip and find the next three terms.
- Write all your answers on your paper.

Apr 3-1:39 PM

Conclusion

1. What is an geometric sequence? List of #s that you mult by a ratio to get next #
2. How would you solve for a_1, using $a_n = a_1 r^{n-1}$? $\frac{a_n}{r^{n-1}}$ $\frac{a_1 r^{n-1}}{r^{n-1}}$
3. Do you have to multiply by the same number in a geometric sequence? yes!
4. Questions???

Apr 3-1:05 PM

Assignment:

Geometric Sequences WS

Apr 3-1:05 PM

GEOMETRIC SERIES

4-9-15

A Geometric Series is formed when the terms of a geometric sequence are added together.

$$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$$

Apr 1-10:13 AM

You can continue the pattern then add or use the formula.

$$a_n = a_1 r^{n-1} \qquad S_n = a_1\left(\frac{1-r^n}{1-r}\right)$$

Ex. 1 - Find S_9 for the series 5, 15, 45, 225, 1125 ...

Ex. 2 - Find S_8 for the series 1, -5, 25, -125, 625 ...

Ex. 3 - Find S_{10} for the series 80, 40, 20, 10, 5, 2.5 ...

Apr 3-1:22 PM

Conclusion

1. What does S_n mean in a geometric series?
2. What must you do first when finding the sum if you do not know the last number in the sequence?
3. Questions???

Apr 3-1:09 PM

Assignment:

Geometric Series WS

Apr 3-1:09 PM

Apr 3-1:47 PM