

## Warm Up: Pre-Calc

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Write the next two terms in the sequence.

1) 4, 12, 36,...

2)  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,...

3) In 2009, a township had a population of 25,000. In 2010, the population increased by 2%. What was the population of the township in 2010?

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## Solutions to Warm Up: Pre-Calc

1) 108, 324

2)  $\frac{1}{16}$ ,  $\frac{1}{32}$

3) 25,500

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**W.A.L.T.:**

Day 8

Identify a geometric sequence.

**W.A.S.I.:**

We can determine the common ratio of a geometric sequence, write an expression and calculate the  $n$ th term.

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**Notes!!! Geometric Sequences**

Geometric sequences are found by multiplying the previous term by a constant.

In general we use this form:

$$a_n = \{a, ar, ar^2, ar^3 \dots\}$$

Where  $r$  is the common ratio

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**Notes!!! Common Ratio**

Common ratio is the amount that a geometric sequence is multiplied by each time.

Formulaically we can find  $r$  with this:

$$r = \frac{a_n}{a_{n-1}}$$

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**Do you see it now?**

Given the geometric sequence:

$$a_n = \{4, 12, 36, 108, \dots\} \quad \text{where } r = 3$$

Then

$$a_n = \{4, 4(3), 4(9), 4(27), \dots\}$$

$$a_n = \{a, ar, ar^2, ar^3, \dots\}$$

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**Notes!!!** Geometric Sequences

$$a_n = \{a, ar, ar^2, ar^3, \dots\}$$

a = first term

r = common ratio

Explicit Formula:

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

$$a_n = 4(3)^{n-1}$$

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**In Class Work:**

Write the explicit form of each geometric sequence.

1) 2, 6, 18, 54, ...

2) -2, 10, -50, 250, ...

3) 3, 18, 108, 648, ...

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**In Class Work:**Find  $a_{12}$  .

1) 2, 6, 18, 54, ...

2) -2, 10, -50, 250, ...

3) 3, 18, 108, 648, ...

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**Today's Activities:**

- Notes Geometric

**P.W. for tonight:**

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Day 8

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**Check Your Understanding**

7. How does a geometric sequence differ from an arithmetic sequence?
8. Identify the missing terms in the geometric sequence \_\_\_\_\_, \_\_\_\_\_, 22.5, 67.5, \_\_\_\_\_, 607.5.
9. Identify which of the sequences below are geometric. If the sequence is a geometric sequence, identify  $a_1$  and  $r$ , write an expression for  $a_n$ , and calculate  $a_{15}$ .
  - I.  $-5, -15, -45, -135, -405$
  - II.  $-5, -1, 3, 7, 11$
  - III.  $1, 4, 9, 16, 25$
  - IV.  $6, -9, 13.5, -20.25, 30.375$

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10. Find  $x$  such that  $x - 4$ ,  $x$ , and  $3x - 8$  are three consecutive terms in a geometric sequence.
11. Determine the first term of a geometric sequence with  $r = 1.4$  and  $a_5 = 76.832$ .
12. Calculate  $n$  for a geometric sequence with  $a_1 = \frac{1}{32}$ ,  $r = 2$ , and  $a_n = 4$ .
13. **Attend to precision.** A new scooter costs \$2,500. The depreciation rate is 30% per year. What is the value of this scooter after 5 years? Round to the nearest dollar.

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