Lesson 1.3

Friday, February 3, 2017 5:42 PM

PREC 11

1.3 Geometric Sequences

Look at the following sequences:

Each successive term is found by multiplying by a constant. This constant is called the Common ratio. A sequence where each term is obtained by multiplying the preceding term by a constant is called a **geometric** Sequence

Example 1: Find the common ratio r:

a) 12, 6, 3, 1.5, ...b) -2, 6, -18, 54, ...c) $a, ax, ax^2, ax^3, ...$ $r = \frac{1}{2}$ or 0.5divide a term

by the previous

one.

a) $\frac{6}{12} = \frac{1}{2}$

c)
$$a, ax, ax^2, ax^3, ...$$

a)
$$\frac{6}{12} = \frac{1}{2}$$

Example 2: For 6, 12, 24, ..., determine:

a.
$$t_{10}$$
 $t_{1}=$

t1=12=6=2

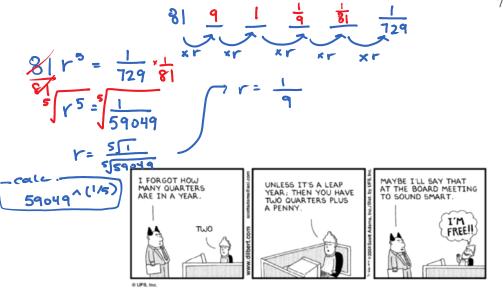
$$t_{13} = 6 \times 2^9 = 3072$$

t4= 48 = 6 x 2 x 2 x 2

Example 3: Consider 3, 6, 12, 24, ...

a. Determine
$$t_{14}$$
. $t_n = t_1 \cdot r^{n-1}$
 $t_{14} = 3 \times 2^{(14-1)}$
 $t_{14} = 7$
 $t_{14} = 7$

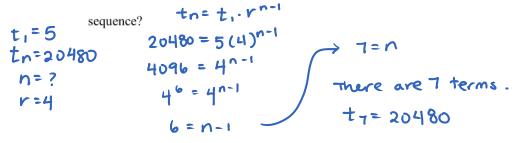
Example 4: The terms placed between two non-consecutive terms of a geometric sequence are called **geometric means**. Insert 4 geometric means between 81 and $\frac{1}{729}$.



Example 5: In a geometric sequence $t_1 = 5$ and $t_5 = 1280$.

a. Determine
$$t_2$$
 and t_6 .
 $t_5 = t_1 \cdot r^{5-1}$ $t_2 = t_1 \cdot r$ $t_6 = t_1 \cdot r^{6-1}$
 $1280 = 5 \cdot r^4$ $= 5 \cdot (4)^5$
 $256 = r^4$ $= 20$ $= 5120$

b. The last term of the sequence is 20480. How many terms are in this



Example 6: Three consecutive terms of a geometric sequence are x+3, x, and x-5 Determine the value of x and the three terms.

$$x \cdot x = \frac{x-5}{x} (x+3)$$

$$x^2 = (x-5)(x+3)$$

$$x^2 = (x-5)(x+3)$$

$$x = x + 3x - 5x - 15$$

$$0 = -3x - 15$$

$$2x = -15$$

$$x = -15/2 \text{ or } -7.5$$
Assignment: pg. 39 #1-6, 9, 10, 12, 18, 23