Geometric Sequences

Geometric Sequence – a sequence where there is a constant ratio between consecutive terms

examples 1) 1,2,4,8,16,...

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

3) -3,6,-12,24,...

t_n formula for each geometric sequence examples

find t_5 and t_9 for each geometric sequence example

Ex.1 How many terms are in the following sequences

(a) -1,-3,-9,-27,...-6561

(b) 0.5,1,2,4,...4096

Ex.2 Given that $t_5 = 1875$ and $t_7 = 46875$, find t_n for the geometric sequence

4. Given the formula for the nth term of a geometric sequence, write the first 4 terms.

a) $t_n = 4(2)^{n-1}$ b) $t_n = 10(3)^{n-1}$

c) $t_n = 2(-2)^{n-1}$ d) $f(n) = 5(-3)^{n-1}$

e) $t_n = -3(2)^{n-1}$ f) $t_n = -2(-3)^{n-1}$

g) $f(n) = 0.5(4)^{n-1}$ h) $t_n = -(-1)^{n-1}$

i) $f(n) = 200(0.5)^{n-1}$

j) $f(n) = -1000(-0.1)^{n-1}$

5. Find the formula for the nth term and find the indicated terms for each of the following geometric sequences.

a) 2, 4, 8, ... ; t_7 and t_{12}

b) 1, 5, 25, ... ; t_6 and t_9

c) 4, 12, 36, ... ; t_8 and t_{10}

d) 64, 32, 16, ... ; t_7 and t_{10}

e) 6, 0.6, 0.06, ... ; t_6 and t_8

f) -3, 6, -12, ... ; t_7 and t_9

g) 729, -243, 81, ... ; t_6 and t_{10}

h) 4, -40, 400, ... ; t_8 and t_{12}

6. Find the number of terms in each of the following geometric sequences.

a) 4, 12, 36, ... , 2916

b) 3, 6, 12, ... , 1536

c) 2, -4, 8, ... , -1024

d) 4374, 1458, 486, ... , 2

e) $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots, \frac{1}{1024}$

f) $\frac{1}{25}, \frac{1}{5}, 1, \ldots, 625$

g) $\frac{2}{81}, \frac{4}{27}, \frac{8}{9}, \ldots, 6912$

h) -409.6, 102.4, -25.6, ... , 0.025

7. Given two terms of each geometric sequence, find t_n for the sequence.

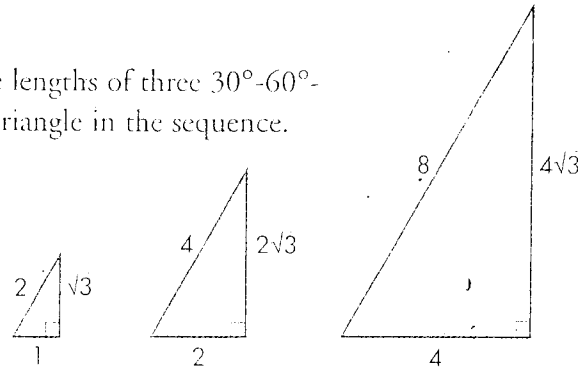
a) $t_3 = 36$, $t_4 = 108$ b) $t_2 = 6$, $t_3 = -12$

c) $t_4 = 64$, $t_5 = 32$ d) $t_2 = 4$, $t_4 = 64$

e) $t_5 = 80$, $t_7 = 320$ f) $t_3 = 99$, $t_5 = 11$

Apply, Solve, Communicate

8. **Measurement** The diagrams show the side lengths of three 30°-60°-90° triangles. Find the side lengths of the next triangle in the sequence.



B

9. **Helium balloon** A balloon filled with helium has a volume of 20 000 cm^3. The balloon loses one fifth of its helium every 24 h.

a) Write the sequence giving the volume of helium in the balloon at the beginning of each day for 5 days, including the first day.

b) What is the common ratio for this sequence?

c) What volume of helium will be in the balloon at the start of the sixth day? the seventh day?