Arithmetic and Geometric Sequences
Worksheet

Arithmetic Sequence - is a sequence of terms that have a common _________________ between them.

General Term: 

Geometric Sequence - is a sequence of terms that have a common _________________ between them.

General Term: 

1. Are the following sequences arithmetic, geometric, or neither? If they are arithmetic, state the value of d. If they are geometric, state r.

a) 6, 12, 18, 24, ... _________________________________

b) 6, 11, 17, ... _________________________________

c) 2, 14, 98, 686, ... _________________________________

d) 160, 80, 40, 20, ... _________________________________

e) -40, -25, -10, 5, ... _________________________________

f) 7, -21, 63, -189, ... _________________________________

2. For the following arithmetic sequences, find a and d and state the formula for the general term. Don’t forget to simplify!

a) -10, -4, 2, 8, 14, ... _________________________________

b) 10, 8, 6, 4, ... _________________________________

c) 36, 31, 25, 21, ... _________________________________
3. Use your formula from question 2c to find the values of \( t_7 \) and \( t_{20} \).

4. For the following geometric sequences, find \( a \) and \( r \) and state the formula for the general term.

   a) 1, 3, 9, 27, ...
   b) 12, 6, 3, 1.5, ...
   c) 9, -3, 1, ...

5. Use your formula from question 4c) to find the values of the \( t_4 \) and \( t_{12} \).

6. Find the number of terms in the following arithmetic sequences. Hint: you will need to find the formula for \( t_n \) first!

   a) 2, 5, 8, ..... , 299
   b) 9, 5, 1, ..... - 251.

Answers:
1a) arithmetic d = 6   b) neither   c) geometric r = 7   d) geometric r = 0.5 or r = \( \frac{1}{2} \)  e) arithmetic d = 15   f) geometric r = -3   2a) a = -10; d=6; \( t_n = 6n-16 \)  b) a = 10; d=-2; \( t_n = -2n+12 \)  c) a = 36; d=-5; \( t_n = -5n+41 \) 3. \( t_7 = 6; t_{20} = -59 \) 4. a) a = 1; r = 3; \( t_n = 1(3)^{n-1} \)  b) a = 12; r = \( \frac{1}{2} \) 5. \( t_4 = -243; t_{12} = -177147 \) 6. a) \( t_n = 3n-1; n = 100 \)  b) \( t_n = -4n+13; n=66 \)