

## Arithmetic and Geometric Sequences Worksheet

**Arithmetic Sequence** - is a sequence of terms that have a common \_\_\_\_\_ between them.

General Term:

$t_n =$

**Geometric Sequence** - is a sequence of terms that have a common \_\_\_\_\_ between them.

General Term:

$t_n =$

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)  $a = 12$ ;  $r =$

$\frac{1}{2}$ ;  $t_n = 12\left(\frac{1}{2}\right)^{n-1}$  c)  $a = 9$ ;  $r = -3$ ;  $t_n = 9(-3)^{n-1}$  5.  $t_4 = -243$   $t_{12} = -177147$  6. a)  $t_n = 3n-1$ ;  $n = 100$  b)  $t_n = -4n+13$ ;  $n=66$