There are two common types of sequences that we will be studying.
   1. **Arithmetic Sequences**
   2. **Geometric Sequences**

Arithmetic Sequences (sequences in which there is a common difference, d, between consecutive terms)

Examples:

   1.   3, 8, 13, 18, 23, ...   (d = 5)

   2.   2, 5, 8, 11, 14, 17, 20, ...   (d = 3)

   3.   18, 16, 14, 12, 10, 8, ...   (d = -2)

   4.   5, 5.2, 5.4, 5.6, 5.8, 6, 6.2, ...   (d = 0.2)

   general arithmetic sequence: a_1 , $a_1 + d$, $a_1 + 2d$, $a_1 + 3d$, $a_1 + 4d$, ...

The Explicit Formula of an Arithmetic Sequence

$$a_n = a_1 + (n - 1)d$$

The Recursive Formula of an Arithmetic Sequence

$$a_{n+1} = a_n + d$$

Problems: Write the explicit and the recursive formulas for each of the following arithmetic sequences.

   1.   3, 8, 13, 18, 23, ...   _____ _____

   2.   2, 5, 8, 11, 14, 17, 20, ...   _____ _____

   3.   18, 16, 14, 12, 10, 8, ...   _____ _____

   4.   5, 5.2, 5.4, 5.6, 5.8, 6, 6.2, ...   _____ _____

Geometric Sequences (sequences in which there is a common ratio, r, between consecutive terms)

Examples:

1.   3, 6, 12, 24, 48, ... $(r = 2)$

2.   2, -10, 50, -250, 1250, -6250, ... $(r = -5)$

3.   64, 32, 16, 8, 4, 2, 1, .5, .25, ... $(r = 0.5)$

4.   450, 45, 4.5, 0.45, 0.045, 0.0045, ... $(r = 0.1)$

general geometric sequence: $a_1 , a_1 r , a_1 r^2 , a_1 r^3, a_1 r^4, ...$

The Explicit Formula of a Geometric Sequence

$$a_n = a_1 r^{(n-1)}$$

The Recursive Formula of a Geometric Sequence

$$a_{n+1} = r\, a_n$$

Problems: Write the explicit and the recursive formulas for each of the following geometric sequences.

1.   3, 6, 12, 24, 48, ...   _____   _____

2.   2, -10, 50, -250, 1250, -6250, ...   _____   _____

3.   64, 32, 16, 8, 4, 2, 1, .5, .25, ...   _____   _____

4.   450, 45, 4.5, 0.45, 0.045, 0.0045, ...   _____   _____