## DO IT NOW!

In an arithmetic sequence, $t_3 = 25$ and $t_9 = 43$. Determine the formula for the general term of this sequence.

## Arithmetic | Geometric

**Arithmetic**

Sequence:
$$t_n = a + (n-1)d$$

Series:
$$S_n = \frac{n}{2}[2a + (n-1)d]$$

$$S_n = \frac{n}{2}(a + t_n)$$

**Geometric**

Sequence:
$$t_n = a \cdot r^{n-1}$$

Series:
$$S_n = \frac{a(r^n - 1)}{r - 1}$$

**Example 1:** In an amphitheater, seats are arranged in 50 semicircular rows facing a domed stage.  The first row contains 23 seats, and each row contains 4 more seats than the previous row.  How many seats are in the amphitheater?

**Note:** *use formula for arithmetic series because difference between consecutive rows is a constant.*

**Example 2:** Determine the sum of -31 -35 -39-.....-403

**Example 3:** Determine the sum of the first 20 terms of the arithmetic series in which the 15th term is 107 and the terms decrease by 3.

**Example 4:** The 10th term of an arithmetic series is 34, and the sum of the first 20 terms is 710. Determine the 25th term.

**Example 5:** Determine the sum of the first seven terms of the geometric series in which $t_5 = 5$ and $t_8 = -40$.

**Method 1:**

**Method 2:**

**Example 6:** Calculate the sum of the geometric series, 960 + 480 + 240 +....+15

**Method 1: write out full series**

**Method 2: Solve using logarithms**

Figure out how many terms are in the series by solving for $n$ in the formula:

**Method 3: Solve using powers with the same base**

**Example 7:** A tennis tournament has 128 entrants. A player is dropped from the competition after losing one match. Winning players go on to another match. What is the total number of matches that will be played in this tournament?

**Note:** The first term is 128/2 = 64 because 2 players participate in one match. The last term is 1 but we don't know what term number it is.