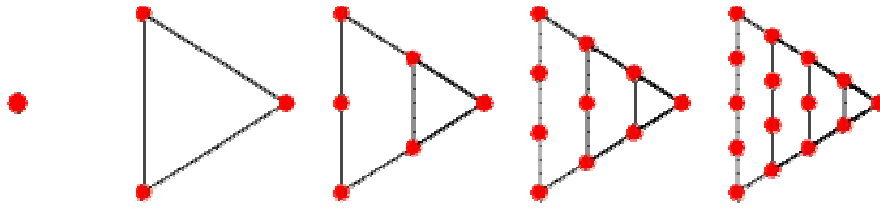


Triangular Numbers:

- A. Triangular numbers are numbers that create triangles. In other words 1, 3, 6, 10, 15, etc
- B. Triangular numbers can be calculated by 1, 1+2, 1+2+3, 1+2+3+4, etc.
- C. See [Adding Sequences](#).
- D. The n^{th} triangular number can be calculated by the equation:

$$\sum_{i=1}^n i = 1 + 2 + \dots + n = \frac{n(n+1)}{2}$$

- E. There are various ways of using triangular numbers:
1. Calculating the n^{th} triangular number.
 - a. Use the formula: $\frac{n(n+1)}{2}$
 2. Finding the triangular number from a given number.
 - a. Solve the formula: $\frac{n(n+1)}{2} = x$, where x is the number.
 3. Adding successive triangular numbers.
 - a. Use the formula: n^2 , where n is the larger of the two triangular numbers.
NOTE: This is because 2 triangles back to back make a square.
 4. Subtracting 2 successive triangular numbers.
 - a. The answer is simply: n, where n is the larger of the two triangular numbers.

F. Below are a few examples:

Ex [1] Find the 10th triangular number.

- a. Using the formula we get: $\frac{(10)(11)}{2}$.
- b. This reduces to (5)(11) or 55.
- c. The answer is 55.

Ex [2] The 8th plus the 9th triangular number is _____.

- a. Since 9 is the largest, we use: 9^2 or 81.
- b. The answer is 81.

Ex [3] The 11th minus the 12th triangular number is _____.

- a. We just use the largest number, which is 12.
- b. However, the answer is going to be negative since the 12th triangular number is larger than the 11th.
- c. The answer is -12.