***Arithmetic and Geometric Sequences***

**Definitions:**

* **A sequence is a set of numbers, called terms, arranged in some particular order.**
* **An arithmetic sequence is a sequence with the difference between two consecutive terms constant.  The difference is called the *common difference.***
* **A geometric sequence is a sequence with the ratio between two consecutive terms constant.  This ratio is called the *common ratio.***

**Let's play guess the sequence!:What type of sequence are the following**

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

**2)  1, 2, 4, 8, 16, . . .**

**3)  24, 12, 6, 3, 3/2, 3/4, . . .**

**4)  55, 51, 47, 43, 39, 35,….**

**5)  2, 5, 10, 17, . . .**

**6)  1, 4, 9, 16, 25, 36, . . .**

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* **Arithmetic formula:       tn  =  t1 +  (n - 1)d**

**tn is the nth term, t1 is the first term, and d is the common difference.**

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* **Geometric formula:           tn = t1 . r(n - 1)**

**tn is the nth term, t1 is the first term, and r is the common ratio.**

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  Here's the answers to the 6 questions above:

* 1) Arithmetic, the common difference d = 5
* 2) Geometric, the common ratio r = 2
* 3) Geometric, r = 1/2
* 4) Arithmetic, d = -4
* 5) Neither, why? (How about no common difference or ratio!)
* 6) Neither again! (This looks familiar, they’re our perfect squares!)

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**Sample problems:**

**Find a formula for each sequence.**

**1)  2, 5, 8, 11, 14, . . .**

**Work: It is arithmetic!  So use the arithmetic formula you learned above!**   
**t1 = 2,  look at the first number in the sequence!**   
**d = 3, look at the common difference!**

**2) 4, 8, 16, 32, . . .**

**Work: It is geometric!  So use the geometric formula you learned up yonder!**   
**t1 = 4, look at the first number in the sequence!**   
**r = 2, look at the common ratio!**

**3)  21, 201, 2001, 20001, . . .**

**Work:  neither**