

## Warm-Up

**Problem 1:** Solve:  $\log_5(4x+11) = 2$

**Problem 2:** Solve:  $\log_2(x+5) - \log_2(2x-1) = 5$

**Problem 3:** Solve:  $\log_8 x + \log_8(x+6) = \log_8(5x+12)$

**Problem 4:** Solve:  $\log_6 x + \log_6(x-9) = 2$

**Problem 5:** Solve:  $\ln(6x-5) = 3$

**Problem 6:** Solve:  $\log_4(3x-2) - \log_4(4x+1) = 2$

## NC Final Exam Question of the Day

3 The equation  $2x^2 - 5x = -12$  is rewritten in the form of  $2(x-p)^2 + q = 0$ . What is the value of  $q$ ?

A  $\frac{167}{16}$

B  $\frac{71}{8}$

C  $\frac{25}{8}$

D  $\frac{25}{16}$

Unit 7 - Series & Statistics

Objectives: F.BF.2 & A.SSE.4

# Day 1: Sequences & Series

**Example 1:** Find the first five terms of each sequence.

a)  $a_n = -2n + 3$   
 $a_1 = -2(1) + 3 = 1$       $a_3 = -2(3) + 3 = -3$   
 $a_2 = -2(2) + 3 = -1$       $a_4 = -2(4) + 3 = -5$   
 $a_5 = -2(5) + 3 = -7$

$a_n$  - term  
 $n$  - term #  
 $a_{n-1}$  - previous term

b)  $a_n = n^2 + 2n$   
 $a_1 = 3$     $a_2 = 8$     $a_3 = 15$     $a_4 = 24$     $a_5 = 35$

c)  $a_n = 2a_{n-1} - 1$ , where  $a_1 = 2$   
 $a_1 = 2$     $a_2 = 2a_1 - 1 = 3$     $a_3 = 2a_2 - 1 = 5$     $a_4 = 2a_3 - 1 = 9$     $a_5 = 2a_4 - 1 = 17$

d)  $a_n = 0.5a_{n-1}$ , where  $a_1 = 20$   
 $a_1 = 20$     $a_2 = 10$     $a_3 = 5$     $a_4 = 2.5$     $a_5 = 1.25$

## Types of Sequences:

- 1) Arithmetic Sequence: the difference between consecutive terms is constant.
- $$a_n = a_1 + (n-1)d$$
- $a_1$  = first term     $n$  = term #  
 $d$  = common difference
- Example: 2, 4, 6, 8, ...  
 $d = 2$

- 2) geometric Sequence: the ratio of consecutive terms is constant.
- $$a_n = a_1 (r^{n-1})$$
- $r$  = common ratio
- Example: 1, 2, 4, 8, ...  
 $r = 2$

1. 3, 15, 75, 375, 1875  
geometric  $r = 5$      $a_1 = 3$   
 $a_n = 3(5^{n-1})$

2.  $a_1 = 30$      $d = 8$   
arithmetic  
 $a_n = 30 + (n-1)8$

3.  $a_1 = -1$      $r = -2$   
geometric  
 $a_n = -1(-2^{n-1})$