**PreCalculus Notes – Unit 10, Day 4**

**Sigma Notation:**

$$\sum\_{}^{}means "add up all the terms of the sequence"$$

In general, the sigma will have numbers around it like this:

$$\sum\_{k}^{n}a\_{k}$$

 k = the first number you plug in, n is the last number you plug in, and ak = the rule you are plugging in to.

***AS YOU READ THROUGH THESE EXAMPLES, PLEASE MAKE SURE YOU KNOW HOW TO GET THE ANSWERS ON YOUR OWN!!***

**Ex 1:**
$$\sum\_{k=1}^{4}k^{2} Solution: 1^{2}+2^{2}+3^{2}+4^{2}=30$$

**Ex 2: To do ex 10 in the calculator: 2nd LIST 🡪 Math and select 5:sum( then 2nd LIST 🡪OPS and select 5:seq(**

Type in: sum(seq(x2, x, 1, 4))

**Ex 3:**

$$\sum\_{k=5}^{21}2k+4 Solution: sum\left(seq\left(2x+4, x, 5, 21\right)\right)=510$$

**Ex 4: Express in summation notation: 1 + 6 + 11 + 16 + … + 46.**

We need to figure out what the “rule” is, AND we need to figure out what # term the 46 is.

Notice, 5 is added every time. We can use the formula for arithmetic sequences to figure out the rule.

Rule is: {an} = 1 + 5(n – 1) = 1 + 5n – 5 = 5n – 4

Set 46 = to the rule to find out what n is: 5n – 4 = 46

 5n = 50

 n = 10 So, 46 is the 10th term!

Solution:

$$\sum\_{k=1}^{10}5k-4 $$

**Recursive Sequences:**

These will give you the first term or so of the sequence. You will have to use the first term to get the second…

**Ex 5: Write the first 5 terms of the sequence a1 = 2; an+1 = 3 + an.**

Notice that they already gave us the first term; a1 = 2. When finding terms in the sequence, we ALWAYS start with n = 1 unless otherwise stated. So plug 1 into the equation, then n=2, and so on.

We will plug **1** in for **n** in the equation **an+1 = 3 + an**. This will now read as: **a1+1 = 3 + a1**.

 So, **a2 = 3 + 2**

Solution: a1 = 2

 a2 = 3 + a1 = 3 + 2 = 5

 a3 = 3 + a2 = 3 + 5 = 8 So the terms are {2, 5, 8, 11, 14}

 a4 = 3 + a3 = 3 + 8 = 11

 a5 = 3 + a4 = 3 + 11 = 14

**Ex 6: find the first 5 terms of: a1 = 1, a2 = 2, an+2 = anan+1**

Here, they have given us the first 2 already. Find the next 3 by plugging in 1, 2, 3.

Solution: a1 = 1

 a2 = 2

 a3 = a1 a2 = 1\*2 = 2 So the terms are {1, 2, 2, 4, 8}

 a4 = a2 a3 = 2\*2 = 4

 a5 = a3 a4 = 2\*4 = 8

**You Try:**



(This is working backwards – your *answer* should look like the *problems* in #1)



