Name_____

Date_____

Advanced Algebra

Assignment Sequence and Series Assignment #10

I can write a direct formula for an arithmetic sequence and a geometric sequence.

Write the direct formula for the following sequences.

1) $\begin{cases} U_1 = 18 \\ U_n = U_{(n-1)} + 4 \\ n \geq 2 \end{cases}$

2) $\begin{cases} U_0 = 18 \\ U_n = .25 * U_{(n-1)} \\ n \geq 1 \end{cases}$

3) $\begin{cases} U_1 = -5 \\ U_n = U_{(n-1)} - 22 \\ n \geq 2 \end{cases}$

4) $\begin{cases} U_0 = 5 \\ U_n = 2 * U_{(n-1)} \\ n \geq 1 \end{cases}$

I can find limit of a shifted geometric sequence:

Key Point: You can rapidly click these out on your calculator. You should be able to enter this quickly at this point and click it out.

Method #2: You could enter into sequence mode and look up a big table value. For example start your table at 100.

$$\begin{cases} U_0 = 18 \\ U_n = .78 * U_{(n-1)} - 2 \\ n \geq 1 \end{cases}$$

$$\begin{cases} U_0 = 200 \\ U_n = .68 * U_{(n-1)} + 4 \\ n \geq 1 \end{cases}$$

$$\begin{cases} U_0 = 300 \\ U_n = .32 * U_{(n-1)} - 18 \\ n \geq 1 \end{cases}$$

Key Point: There is NO LIMIT for all arithmetic sequences. It does not matter if it is an increasing or a decreasing arithmetic sequence. Arithmetic= NO LIMIT

Key Point: Geometric Sequences. **Geometric Increasing sequences does NOT have a limit**.

Geometric Decreasing the Limit is ZERO.

You can always verify that by clicking it out on your calculator.

Applications are a key learning target when dealing with sequences.

1) A Tree nursery harvests 38% of its trees each year for selling. However they plant 200 trees each year to maintain their tree farm. The nursery started its operation with 1000 trees.

a) Write the recursive sequence to describe this scenario.

b) How many trees does the farm have after 5 years?

c) What is the long run number of trees that this nursery has at any moment in time. (This means limit)

2) You deposit $500 into an account that earns 6% APR. You make no other deposits. What is the balance of the account in 6 years?

3) You deposit $1,000 into an account that earns 7% APR. You make no other deposits. How many years does it take for the account to triple?

4) You deposit $300 into an account that earns 8.25% APR compounded monthly. You make no other deposits. What is the account balance in 5 years?

5) You buy a boat for $32,000. The boat depreciates 7% each year. What is the value of the boat in 8 years?

6) You buy a boat for $40,000. The boat depreciates 6% each year. How many years does it take for the boat to have a value of $32,000.

7) You take out a loan for college. The amount that you take out is $50,000. The APR on this account is 5% compounded monthly. You make no payments on this account during college. What is the loan balance in 4 years?

I can use sequence mode to help solve shifted applications.

1) You take out a loan for $45,000 to buy a car. The APR on the account is 5.25% compounded monthly. You also make $500 payments each month. Write the recursive sequence for this scenario. What is the loan balance after 1 year? How long does it take to pay off the loan? How much money have you paid for the car?

2) The following sequence represents a loan measured in MONTHS

$$\begin{cases} U_0 = 2{,}000 \\ U_n = (1 + \frac{.122}{12}) * U_{(n-1)} - 150 \\ n \geq 1 \end{cases}$$

What is the initial amount that was borrowed?
What is the deposit or payment amount
What is the APR on this LOAN?
What is the APR being compounded by?

SUMS

1) What is the arithmetic sum S_{12} if U_2=8 and U_4=14
2) What is the arithmetic sum S_{50} if U_1 = 18 and the common difference is 3