PreCalculus UNIT 3

DISCRETE and FINANCE (MCR) – journal questions

Summarize everything you need to know about these topics. Use examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary

1. BINOMIAL EXPANSION with PASCAL's TRIANGLE:

   Show the triangle. Explain how to create new rows. Then explain how to use it with this example $(3x^3-2)^4$

2. Using DIFFERENCES to find an EQUATION from a table of values below: show all steps, include explanations as needed

x	1	2	3	4	5	6
y	−5	0	1	−8	−33	−80

3. NOTATION & VOCABULARY
   a. What is the difference between the following?
   - Arithmetic vs Geometric
   - Finite vs. Infinite
   - Sequences vs. Series
   - Recursive formula vs. Explicit formula

   b. Show how to use the Recursive formula $t_n = t_{n-1} + n,\ \ t_1 = 2$ to find five terms of a sequence. Then classify the sequence as arithmetic/geometric/neither

   c. Show how to use the Explicit formula $t_n = \dfrac{n^2-4}{2+n}$ to find five terms of a sequence. Then classify the sequence as arithmetic/geometric/neither

4. SEQUENCES
   a. Find the explicit formulas for n-th term. Explain
      i. $4,\ \frac{13}{3},\ \frac{14}{3},\ 5,\ \frac{16}{3},\ \ldots$
      ii. $-4,\ 12,\ -36,\ 108,\ -324,\ \ldots$
      iii. $-6,\ -3,\ -2,\ -\frac{3}{2},\ -\frac{6}{5},\ \ldots$

   b. Find number of terms Explain
      i. $6,-12,24,-48,\ldots,-768.$
      ii. $3,15,27,\ldots,495$

   c. Find formula given two random terms. Explain
      i. Arithmetic Ex. $t_{10}=300, t_{15}=325$
      ii. Geometric Ex. $t_5=768, t_9=196608$

   d. Word problem with an offset between time and position on the list

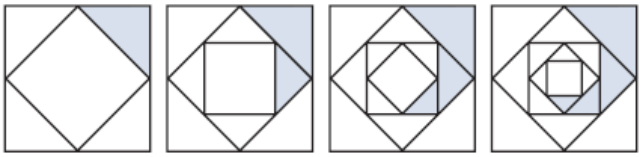
   > Your friend lives 2km away from your home. You leave their place at 12:30pm and continue walking away from both your home and your friend's home towards a mall. The distance from your home increases at 120m per minute… Develop a sequence of values of distances away from your home, then determine the clock time when you will be 3.8km away?

5. SERIES
   a. Using Arithmetic Sum formula:

   > During a skydiving lesson, Chandra jumps out of a plane and falls 4.9 m during the first second. For each second afterward, she continues to fall 9.8 m more than the previous second. After 15 s, she opens her parachute. How far did Chandra fall before she opened her parachute?

   b. Using Geometric Sum formula:

   > A square has a side length of 12 cm. The midpoints of the square are joined creating a smaller square and four triangles. If you continue this process, what will be the total area of the shaded region in stage 6?



6. FINANCE

a. Define the following Simple interest, Compound interest, Continuous compounding.

b. SIMPLE INTEREST ex	c. COMPOUND INTEREST ex	d. CONTINUOUS compounding ex (AP)
Len invests $5200 at 3%/a simple interest, while his friend Dave invests $3600 at 5%/a simple interest. How long will it take for Dave's investment to be worth more than Len's?	Sally invests some money at 6%/a compounded annually. After 5 years, she takes the principal and interest and reinvests it all at 7.2%/a compounded quarterly for 6 more years. At the end of this time, her investment is worth $14 784.56. How much did Sally originally invest?	An amount of $3,000.00 is deposited in a bank paying an annual interest rate of 3 %, compounded continuously. How long would it take for the money to double?

7.

a. Define the term ANNUITY, then solve the following questions

b. PRESENT value annuity	c. FUTURE value annuity
How much money must be invested now at 6.6% per annum compounded bi-weekly to provide for biweekly payments of $400 for 3 years? Then find out how much interest grew over this investment period.	Kim wants to have $25,000, she is able to save 200 per month. How long (be specific to the day) does she have to save at a rate of 3% compounded monthly in order to achieve that goal? What much is interest money given by the bank?

d. Copy the following into your journal. Explain all the letters. Add any other notes you feel will help you decide what formula to use.