

**Mathematics 2200**  
**TEST #1: Sequences and Series**

Date: \_\_\_\_\_

Name: \_\_\_\_\_

**Part A: Multiple Choice. 10 marks**

\_\_\_\_\_ / 25 = \_\_\_\_\_ %

Place the letter corresponding to the correct answer in the blank on the right.

1. What is the general term for the sequence  $\{7, 3, -1, -5, -9, \dots\}$ ? 1. \_\_\_\_\_

(A)  $t_n = -4n + 3$

(B)  $t_n = 4n + 3$

(C)  $t_n = -4n + 11$

(D)  $t_n = 4n + 11$

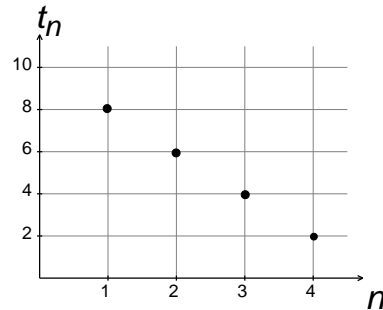
2. Which formula generates the sequence represented by the graph shown? 2. \_\_\_\_\_

(A)  $t_n = -2n + 10$

(B)  $t_n = -n + 10$

(C)  $t_n = -n + 8$

(D)  $t_n = -2n + 8$



3. Which equation represents an arithmetic sequence that has a common difference of 4 and  $t_{10} = 7$ ? 3. \_\_\_\_\_

A)  $t_n = -4n + 47, n \in N$

B)  $t_n = 4n - 33, n \in N$

C)  $t_n = 2n - 13, n \in N$

D)  $t_n = n - 3, n \in N$

4. What is  $S_{10}$  for the series:  $\{4 + 11 + 18 + 25 + \dots\}$ ? 4. \_\_\_\_\_

A) 355

B) 390

C) 710

D) 780

5. Which is a diverging sequence? 5. \_\_\_\_
- A)  $\left\{-4, 4, -2, 2, -1, 1, -\frac{1}{2}, \frac{1}{2}, \dots\right\}$   
 B)  $\{1, -2, 3, -4, 5, -6, \dots\}$   
 C)  $\left\{5\frac{1}{2}, 5\frac{1}{4}, 5\frac{1}{8}, 5\frac{1}{16}, \dots\right\}$   
 D)  $\{0.1, 0.01, 0.001, 0.0001, \dots\}$
6. If a geometric sequence has  $t_1 = 2$ ,  $t_4 = 54$ , and  $t_6 = 2x$ , what is the value of  $x$ ? 6. \_\_\_\_
- A) 81                      B) 162  
 C) 243                     D) 482
7. What are the missing terms for the geometric sequence  $\{8, \square, 2, \square, \square, \dots\}$ ? 7. \_\_\_\_
- A)  $4, \frac{1}{2}, \frac{1}{4}$               B)  $6, -4, -12$   
 C)  $5, -1, -4$             D)  $4, 1, \frac{1}{2}$
8. A yeast population of 5 yeast cells triples every hour. After 1 hour there are 15, after 2 hours there are 45, and so on. How many yeast cells will there be in 5 hours? 8. \_\_\_\_
- A) 135                      B) 405  
 C) 1215                    D) 3645
9. Which best describes the sequence,  $t_n = 0.7(5)^n$ ,  $n \in \mathbb{N}$ ? 9. \_\_\_\_
- A) arithmetic and converging  
 B) arithmetic and diverging  
 C) geometric and converging  
 D) geometric and diverging
10. What is the sum of the series  $\{8 + 7 + \frac{49}{8} + \frac{343}{64} + \dots\}$ ? 10. \_\_\_\_
- A) 27  
 B) 26  
 C)  $\frac{64}{15}$   
 D) 64

**Part B: Long Answer (30 marks).**

**Answer the following questions in the space provided.  
Be sure to show all workings to receive full credit.**

1. What is the general formula for the arithmetic sequence where  $t_{11} = 25$  and  $t_{30} = 101$ .

\_\_\_ / 4

2. Find the sum of the terms in the arithmetic sequence  $-29, -25, -21, \dots, 91$ .

\_\_\_ / 4

3. In a geometric sequence, the 3<sup>rd</sup> term is 72 and the sixth term is 576. \_\_\_\_\_ / 5

Determine the general formula that describes the sequence and use it to find  $S_6$ .

4. A basketball is thrown into the air and reaches a maximum height of 12 m. Upon hitting the floor it rebounds 60% of the distance fallen. In theory, what is the total vertical distance the ball will travel before it comes to rest?

\_\_\_\_\_ / 4