MAC 1140, Fall 2017

Exam #5

December 4, 2017

Name ______________________________

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.
- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.
- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of "0" will be assigned to anyone who uses a cell phone during the examination or if one is found within hands reach.
- Calculators are not allowed on this exam.
- The exam consist of two parts. Part I contains five multiple choice questions worth 5 points each. Part II contains 6 open ended questions.

Part I

Choose your answer from five available choices. No partial credit will be given for wrong answers.

1. Find the term containing x^9 in the expansion of $(x+3)^{12}$

   (a) $\binom{12}{3}x^9 3^9$

   (b) $\binom{12}{9}x^9 3^3$

   (c) $\binom{12}{3}x^9 3^3$

   (d) $\binom{9}{12}x^9 3^3$

   (e) None of the above

2. Compute the binomial coefficient $\binom{6}{3}$

   (a) 15

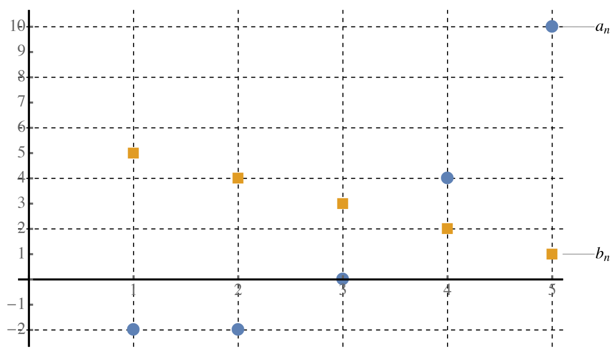
   (b) 20

   (c) 30

   (d) 40

   (e) None of the above

3. Given the graph of two sequences below, find $a_3 + b_4$.



   (a) 0

   (b) 1

   (c) 2

   (d) 3

   (e) None of the above

4. Evaluate $\displaystyle\sum_{k=1}^{5} k(k-1)$

   (a) 30

   (b) 35

   (c) 40

   (d) 50

   (e) None of the above

5. The sequence $\frac{1}{2}, 3, 18, 108, \ldots$ is

   (a) arithmetic

   (b) geometric

   (c) neither

Part II

6. (a) (10 pts) Find the general formula for $1, 4, 7, 10, 13, \ldots$

   (b) (6 pts) Find a_{100}.

   (c) (10 pts) Find the sum $1 + 4 + 7 + 10 + 13 + \cdots + 121$.

7. (a) (10 pts) Given $a_3 = 4$ and $r = \frac{1}{2}$, find the 7th term of this sequence.

   (b) (8 pts) Write the sum of the first 20 terms or this sequence. Do not evaluate or simplify.

8. (12 pts) Write the sum in sigma notation $\frac{1}{2} + \frac{2}{4} + \frac{3}{8} + \frac{4}{16} + \frac{5}{32} + \cdots + \frac{10}{1024}$.

9. (12 pts) Expand $(1 - 2x)^5$ using the Binomial theorem. Any other method will result in zero pts.

10. (7 pts) Find the 5th term of the sequence given by the recursive formula: $a_1 = 1, a_n = n \cdot a_{n-1}$.

11. Evaluate the expression

    (a) (5 pts) $\frac{5!}{3!}$

    (b) (5 pts) $\frac{(n+2)!}{n!}$

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