Name:_____

No Work ⇔ No Points

Use Pencil Only ⇔ Be Neat & Organized

1. Consider an arithmetic sequence with $a_1 = 8$, and $d = 12$.

   (a) (2 points) Find its first 4 terms.

                                         (a) _____

   (b) (3 points) Find a_n.

                                         (b) _____

   (c) (2 points) Find a_{20}.

                                         (c) _____

   (d) (3 points) Find s_n.

                                         (d) _____

   (e) (3 points) Find s_{25}.

                                         (e) _____

2. Consider an geometric sequence with $a_1 = 1$, and $r = -2$.

   (a) **(2 points)** Find its first 4 terms.

(a) _____

   (b) **(3 points)** Find a_n.

(b) _____

   (c) **(2 points)** Find a_{10}.

(c) _____

   (d) **(4 points)** Find s_n.

(d) _____

   (e) **(4 points)** Find s_8.

(e) _____

3. Find

   (a) **(1 point)** $_{12}C_4$

(a) _____

   (b) **(1 point)** $_8P_3$

(b) _____

4. Consider $(2x^2 - y)^{11}$,

   (a) **(1 point)** Find $\binom{11}{6}$.

<div align="right">(a) _____</div>

   (b) **(4 points)** Find the first three terms.

<div align="right">(b) _____</div>

   (c) **(3 points)** Find its 6th term.

<div align="right">(c) _____</div>

5. (2 points) Find $\binom{n}{n-1}$.

<div align="right">5. _____</div>

6. (3 points) Find $64 - 32 + 16 - 8 + \cdots$.

<div align="right">6. _____</div>

7. Consider $1 + 3 + 3^2 + 3^3 + \cdots + 3^{n-1} = \frac{1}{2}(3^n - 1)$,

    (a) **(1 point) Show that it works for $n = 1$.**

    (a) _____

    (b) **(1 point) Show that it works for $n = 2$.**

    (b) _____

    (c) **(5 points) Use mathematical induction to prove the statement is true for all natural numbers n.**