NAME YOU ASKED TO BE CALLED IN CLASS: _____

SCORE: ___ / 20 POINTS

WHERE INDICATED, YOU MUST SHOW THE WORK THAT LEAD TO YOUR ANSWER TO GET FULL CREDIT.

Find the first 5 terms of the sequence defined $a_n = \dfrac{1 + (-1)^n}{n!}$.   **SCORE: ___ / 3 POINTS**

SIMPLIFY YOUR ANSWERS.

$a_1 = \dfrac{1 + (-1)^1}{1!} = \boxed{0}$ **½ point**

$a_2 = \dfrac{1 + (-1)^2}{2!} = \boxed{1}$ **½ point**

$a_3 = \dfrac{1 + (-1)^3}{3!} = \boxed{0}$ **½ point**

$a_4 = \dfrac{1 + (-1)^4}{4!} = \boxed{\dfrac{1}{12}}$ **½ point**

$a_5 = \dfrac{1 + (-1)^5}{5!} = \boxed{0}$ **½ point**   ➡ **PLUS ½ point if you got at least 4 of the terms correct**

Evaluate $\displaystyle\sum_{m=2}^{5} m(m-4)$.   **SCORE: ___ / 3 POINTS**

SHOW YOUR WORK. SIMPLIFY YOUR ANSWER.

$= 2(2-4) + 3(3-4) + 4(4-4) + 5(5-4)$
$= 2(-2) + 3(-1) + 4(0) + 5(1)$
$= \boxed{-4} \quad \boxed{-3} \quad \boxed{+0} \quad \boxed{+5}$
   ½ point ½ point ½ point ½ point
$= \boxed{-2}$
   1 point

Find the first 4 terms of the sequence defined recursively by $a_1 = 2,\quad a_k = k^2 - a_{k-1}$ (for $k \geq 2$).   **SCORE: ___ / 3 POINTS**
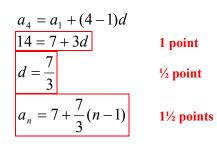
$a_1 = 2$ ➡ **MINUS ½ point if you forgot to write $a_1 = 2$**

$a_2 = 2^2 - a_1 = 4 - 2 = \boxed{2}$ **1 point**

$a_3 = 3^2 - a_2 = 9 - 2 = \boxed{7}$ **1 point**

$a_4 = 4^2 - a_3 = 16 - 7 = \boxed{9}$ **1 point**

Fill in the blanks: For the sum $\displaystyle\sum_{k=2}^{m} a_k$, m is called the   <u>upper limit of summation</u> ,   **SCORE: ___ / 2 POINTS**

k is called the   <u>index (OR dummy index) of summation</u> , and

2 is called the   <u>lower limit of summation</u> .

Find a general formula for the arithmetic sequence whose first term is 7 , and whose fourth term is 14 .   **SCORE: ___ / 3 POINTS**
SHOW YOUR WORK.

$a_4 = a_1 + (4-1)d$

$\boxed{14 = 7 + 3d}$ **1 point**

$\boxed{d = \dfrac{7}{3}}$ **½ point**

$\boxed{a_n = 7 + \dfrac{7}{3}(n-1)}$ **1½ points**

Use sigma notation to write the sum $\dfrac{1}{4} + \dfrac{3}{8} + \dfrac{7}{16} + \dfrac{15}{32} + \dfrac{31}{64}$.   **SCORE: ___ / 3 POINTS**

½ point $\boxed{5}$

½ point $\displaystyle\sum \boxed{\dfrac{2^n - 1}{2^{n+1}}}$ **½ point for numerator, ½ point for denominator ➡ PLUS ½ point if both correct**

½ point $\boxed{n = 1}$

OR

½ point $\boxed{6}$

½ point $\displaystyle\sum \boxed{\dfrac{2^{n-1} - 1}{2^{n}}}$ **½ point for numerator, ½ point for denominator ➡ PLUS ½ point if both correct**

½ point $\boxed{n = 2}$

Simplify the expression $\dfrac{(2n-4)!}{(2n-2)!}$.   **SCORE: ___ / 3 POINTS**
SHOW YOUR WORK.

$= \boxed{\dfrac{(2n-4)\cdots(3)(2)(1)}{(2n-2)(2n-3)(2n-4)\cdots(3)(2)(1)}}$ OR $= \boxed{\dfrac{(2n-4)!}{(2n-2)(2n-3)(2n-4)!}}$

          1½ points   **1½ points**

$= \boxed{\dfrac{1}{(2n-2)(2n-3)}}$ $= \boxed{\dfrac{1}{(2n-2)(2n-3)}}$

        1½ points   **1½ points**