

## Show All Work For FULL Credit!!!!

## 1. Evaluate:

$$\sum_{j=1}^{10} \left( 2j^3 - 3j^2 + \frac{2}{3}j - \frac{2}{3} \right)$$

$$= 2 \sum_{j=1}^{10} j^3 - 3 \sum_{j=1}^{10} j^2 + \frac{1}{3} \sum_{j=1}^{10} j - \sum_{j=1}^{10} \frac{2}{3}$$

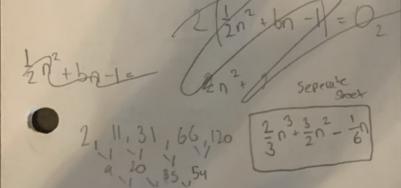
$$= \frac{2}{1} \binom{100(1)}{11} - \frac{3}{1} \binom{10(1)(1)}{6} + \frac{2}{3} \binom{10(1)}{2} - \frac{10}{10} \binom{2}{3}$$

$$= \frac{24200}{11} - \frac{6930}{6} + \frac{220}{6} - \frac{20}{3}$$

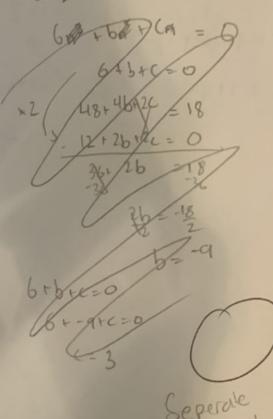
## 2. Determine an explicit formula to find the nth partial sum.

$$\begin{array}{ccc}
1 & & & & & \\
2 & & & & \\
2 & & & & \\
3 & & & & \\
\end{array}$$

$$\begin{array}{cccc}
\sum_{x=1}^{n} \left(2x^2 + x - 1\right)
\end{array}$$



## 3. Find a formula for the following sequence:



4. Prove using mathematical induction:

$$\sum_{i=1}^{n} \left( i \cdot 2^{i-1} \right) = 1 + (n-1) \cdot 2^{n}$$

5. Given:

$$\frac{1}{(1)(3)} + \frac{1}{(3)(5)} + \frac{1}{(5)(7)} + \dots + \frac{1}{(2n-1)(2n+1)}$$

a) Determine a formula for the nth partial sum.

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8200

$$-3+(n-1)^2$$
  
= 3+2n-2

b) Prove using mathematical induction:

$$5 = \frac{1}{(1)(3)} = \frac{1}{2(1)+1} = \frac{1}{3}$$

$$S_{K} = \frac{1}{(11(5))} + \frac{1}{(3)(5)} + \frac{1}{(5)(7)} + \frac{1}{(2K-1)(2K+1)}$$

3rd degree

11=1 21=2 31 =6

an3+ bn2 + Cn+02

0 2, 11, 31, 66, 120

6a=4 a = 2

= = = 2 n3+bn2+Cn

2= = + b+C = 4= = 4 + 26 + 24 11= 2(8) + 4b+2C - 11= 16 + 4b+2c

7=4+26

2-2-2-6

b= 37

 $= \frac{2}{3} n^3 + \frac{3}{2} n^2 + \frac{1}{6}$ 

$$64n^3 + bn^2 + (n + 46)$$
  
 $2n^3 + bn^2 + (n + 46)$ 

$$2+b+c=0$$

$$2+3+c=0$$

$$16+4b+2c=18$$

$$4+2b+2c=0$$

$$18^{2} 2b = 18$$

$$2n^{3}+3n^{2}-5n$$

$$18^{2} 2b = 6$$

$$5=3$$

$$12n^{2}+3n-5$$