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CS-225: Discrete Structures in CS

Homework 2, Part 2

Exercise Set 5.1, Problem #15, #16, #57, #60

Canvas Summation Problems

#15.

$a_n = (-1)^{(n-1)} \cdot \frac{(n-1)}{n}\ where\ n\ \geq 1$

#16.

$a_n = 3\ \cdot\ 2^{n-1}\ where\ n\ \geq 1$

#57.

$$\sum_{j=0}^{n-2} \frac{j+1}{(n-j-1)^2}$$

#60.

$$\sum_{k=1}^{n} (16k^2 + 3)$$

----Continued on pg2----

Canvas Summation Problems

#1.

$\sum_{i=200}^{500}(3i-\frac{7}{2}) =>$

$\sum_{i=200}^{500} 3i - \sum_{i=200}^{500}\frac{7}{2} =>$

$3(\sum_{i=200}^{500}) - \frac{7}{2}(\sum_{i=200}^{500} 1) =>$

$3\left(\sum_{i=1}^{500} i - \sum_{i=1}^{199} i\right) - \frac{7}{2}(\sum_{i=1}^{500} 1 - \sum_{i=1}^{199} 1) =>$

$$3\left(\frac{500(500+1)}{2} - \frac{19(19+1)}{2}\right) - \frac{7}{2}(500-199)$$

#2.

$\sum_{j=0}^{20}(3f^2 - (-2)^j) =>$

$\sum_{j=0}^{20} 3j^2 - \sum_{j=0}^{20}(-j)^2 =>$

$3\sum_{j=0}^{20} j^2 - \sum_{j=0}^{20}(-2)^j =>$

$$3\left(\frac{\big(20(20+1)\big)\cdot\big((2)(20+1)\big)}{6}\right) - \left(\frac{(-2)^{20+1}-1)}{(-2)-1}\right)$$

#3.

$\sum_{j=45}^{70}(4^j - 2^j) =>$

$\sum_{j=45}^{70} 4^j - \sum_{j=45}^{70} 2^j =>$

$$\left(\frac{(4^{70+1}) - (4^{45})}{4-1}\right) - \left(\frac{(2^{70+1}) - (2^{45})}{2-1}\right)$$