Khrystian Clark

CS-225: Discrete Structures in CS

Homework 2, Part 2

Exercise Set 5.1 of the required textbook: Problem #13, #15, #57, #60

13) $a_n = \frac{1}{n} - \frac{1}{n+1}$ where n is an integer and n≥1

15) $a_n = \left(\frac{n-1}{n}\right)(-1^{n-1})$ where n is an integer and n≥1

57)

j=i-1, i=j+1

i=1, j=1-1=0, j=0

if i=n-1, then j=(n-1)-1= n-2. J=n-2

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

60) $\sum_{k=1}^{n}[2(3k^2+4)+5(2k^2-1)]$

Questions 1-3 on canvas

1) $\sum_{i=12}^{50}\left(2i-\frac{3}{2}\right)$ ; $\sum_{i=12}^{50} 2i - \sum_{i=12}^{50}\frac{3}{2}$ ;

$2\times\sum_{i=12}^{50} i - \sum_{i=12}^{50}\frac{3}{2}$ ; $2\left(\sum_{i=1}^{50} - \sum_{i=1}^{12} i\right) - \sum_{1=12}^{50}\frac{3}{2}$

Answer: $2\left(\frac{50(50+1)}{2} - \frac{11(11+1)}{2}\right) - \frac{3}{2}(50-12+1)$

2) $\sum_{J=0}^{20} 5j^2 - \sum_{J=0}^{20} -2^J$ ; $5\sum_{J=0}^{20} J^2 - \frac{(-2)^{20+1}-1}{(2)-1}$

Answer: $5\left(\frac{20(20+1)(2\times20+1)}{6}\right) - \frac{(-2)^{20+1}-1}{(2)-1}$

3) $\sum_{J=37}^{70} 2^j + \sum_{J=37}^{70} 4^J$

$\left(\sum_{J=0}^{70} 2^J - \sum_{J=0}^{36} 2^J\right) + \left(\sum_{J=0}^{70} 4^J - \sum_{J=0}^{36} 4^J\right)$

Answer: $\left(\frac{2^{70+1}-1}{2-1} - \frac{2^{36+1}-1}{2-1}\right) + \left(\frac{4^{70+1}-1}{4-1} - \frac{4^{36+1}-1}{4-1}\right)$