

MAT2440, Quiz6, Spring2025

ID: _____

Name: Sol

1. Find the first four term a_0, a_1, a_2, a_3 of the given sequence

Sol

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

$$a_0 = 0^3 + \frac{2}{0+1} = 0 + 2 = 2$$

$$a_1 = 1^3 + \frac{2}{1+1} = 1 + \frac{2}{2} = 1 + 1 = 2$$

$$a_2 = 2^3 + \frac{2}{2+1} = 8 + \frac{2}{3} = \frac{26}{3}$$

$$a_3 = 3^3 + \frac{2}{3+1} = 27 + \frac{2}{4} = \frac{110}{2}$$

2. Find the value of the sum

Sol

$$\sum_{i=1}^3 \sum_{j=0}^4 (i + (-2)^j)$$

$$\begin{aligned} & \sum_{i=1}^3 \left(\underbrace{i + (-2)^0}_{j=0} + \underbrace{i + (-2)^1}_{j=1} + \underbrace{i + (-2)^2}_{j=2} + \underbrace{i + (-2)^3}_{j=3} + \underbrace{i + (-2)^4}_{j=4} \right) \\ &= \sum_{i=1}^3 \left(5i + (-2)^0 + (-2)^1 + (-2)^2 + (-2)^3 + (-2)^4 \right) \\ &= \sum_{i=1}^3 (5i + 1 - 2 + 4 - 8 + 16) \\ &= \sum_{i=1}^3 (5i + 11) = 5 \cdot 1 + 11 + 5 \cdot 2 + 11 + 5 \cdot 3 + 11 \\ &= 5 + 11 + 10 + 11 + 15 + 11 \\ &= 30 + 33 = 63 \end{aligned}$$