

MATH 1210 Problem Workshop 2

1. Express the following in sigma notation

(a) $2 + \frac{3}{\sqrt{2}} + \frac{4}{\sqrt{3}} + \frac{5}{2} + \cdots + \frac{101}{10}$

(b) $2 + \frac{1}{\sqrt{2}} + \frac{2}{3\sqrt{3}} + \frac{1}{4} + \frac{2}{5\sqrt{5}} + \cdots + \frac{1}{10\sqrt{20}}$

(c) $1 - \frac{2}{9} + \frac{6}{25} - \frac{24}{49} + \frac{120}{81} - \cdots$

2. Evaluate

$$\sum_{n=16}^{39} (2n^2 + 3n + 4).$$

3. Evaluate

$$\sum_{j=-11}^8 ((j+12)^3 + (j+12)^2 - j - 12).$$

4. Evaluate the sum

$$1(52)^2 + 2(51)^2 + 3(50)^2 + \cdots + 33(20)^2.$$

5. Prove that $\sum_{l=n}^{2n} (l+1) = \frac{1}{2}(n+1)(3n+2)$ by

(a) Mathematical Induction

(b) the summation identities.

Answers

1. (a) $\sum_{n=1}^{100} \frac{n+1}{\sqrt{n}}$

(b) $\sum_{n=1}^{20} \frac{2}{n\sqrt{n}}$

(c) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}n!}{(2n-1)^2}$

2. 40,676

3. 46,760

4. 562,496