

Math 112

Homework 3 Solutions

Section 5.7 Part 1

$$5.7 \text{ \#2: } \sum_{n=1}^{50} \sqrt[3]{2n}$$

$$5.7 \text{ \#4: } \sum_{j=1}^{15} 2^j$$

$$5.7 \text{ \#6: } \sum_{k=1}^4 \sqrt{k} = \sqrt{1} + \sqrt{2} + \sqrt{3} + \sqrt{4} \approx 6.14626$$

$$5.7 \text{ \#8: } \cos(0) + \cos(\pi/2) + \cos(\pi) + \cos(3\pi/2) + \cos(2\pi) + \cos(5\pi/2) = 1$$

$$5.7 \text{ \#10: } \frac{1}{6}(21)(22)(43) = 3311$$

$$5.7 \text{ \#12: } \sum_{k=1}^{19} k^2 + 2 \sum_{k=1}^{19} k = \frac{1}{6}(19)(20)(39) + 2 \cdot \frac{1}{2}(19)(20) = 2850$$

Section 5.7 Part 2

5.7 #26:

$$\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + \cdots + n^2}{n^3} = \lim_{n \rightarrow \infty} \frac{n(n+1)}{2n^2} = \frac{1}{2}$$

5.7 #34:

$$\begin{aligned} \int_0^3 x \, dx &= \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{3i}{n} \frac{3}{n} \\ &= \lim_{n \rightarrow \infty} \frac{9}{n^2} \frac{n(n+1)}{2} \\ &= \lim_{n \rightarrow \infty} \frac{9}{2} + \frac{9}{2n} \\ &= 9/2 \end{aligned}$$

$$5.7 \text{ \#42: } \lim_{n \rightarrow \infty} \frac{2}{n} \sum_{j=1}^n \left(\frac{2j}{n}\right)^3 = \int_0^2 x^3 \, dx = 4$$