

## Quiz 8 Solution - Math 165

Name: \_\_\_\_\_

Show all work to receive maximum credit for each problem. You may not use your book, notes, or a calculator on this quiz. Give exact answers, not decimal approximations. This quiz is worth 25 points.

1. (5 points) Evaluate  $\sum_{i=1}^7 \pi$

$$\text{Solution: } \sum_{i=1}^7 \pi = 7\pi$$

2. (5 points) Assume  $\sum_{i=1}^n a_i = 10$ ,  $\sum_{i=1}^n b_i = 12$ . Find  $\sum_{i=1}^n (2a_i - b_i)$ .

$$\text{Solution: } \sum_{i=1}^n (2a_i - b_i) = 2(10) - 12 = 8$$

3. (5 points) Evaluate  $\sum_{i=1}^n (i-1)^2$  using the special sum formulas - do not simplify.

$$\text{Solution: } \sum_{i=1}^n (i-1)^2 = \sum_{i=1}^n i^2 - 2i + 1 = \frac{n(n+1)(2n+1)}{6} - 2\frac{n(n+1)}{2} + n$$

4. (5 points) Calculate the Riemann Sum of  $f(x) = x + 1$  over  $[-2, 2]$  using the partition  $-2 < -1 < 0 < 1 < 2$  and sample points  $\bar{x}_1 = -2$ ,  $\bar{x}_2 = -1$ ,  $\bar{x}_3 = 1$ ,  $\bar{x}_4 = 1$ .

$$\text{Solution: } \Delta x_i = 1 \text{ for all } i \Rightarrow R_P = f(-2) + f(-1) + f(1) + f(1) = -1 + 0 + 2 + 2 = 3$$

5. (5 points) Use the definition of the integral to calculate  $\int_0^2 (x^2 + 2) dx$  (in other words, find the area under the curve of  $x^2 + 2$  over  $[0, 2]$  )

$$\text{Solution: } \Delta x = \frac{2}{n}, x_i = \frac{2i}{n} \Rightarrow \int_0^2 (x^2 + 2) dx = \lim_{n \rightarrow \infty} \sum_{i=1}^n \left( \left( \frac{2i}{n} \right)^2 + 2 \right) \left( \frac{2}{n} \right) = \frac{8}{3} + 4 = \frac{20}{3}$$