

Math 152 Quiz #1 Solutions

1. Antidifferentiating: $f(x) = 6\left(\frac{x^3}{3}\right) + 3e^x + C = 2x^3 + 3e^x + C$

We want to find C such that $f(0) = 5 \Rightarrow f(0) = 2(0)^3 + 3e^0 + C = 5$
 $3 + C = 5$
 $C = 2$

So, $f(x) = 2x^3 + 3e^x + 2$.

2. $\sum_{i=1}^{25} 3\sqrt{i} = 3\sqrt{1} + 3\sqrt{2} + 3\sqrt{3} + \dots + 3\sqrt{24} + 3\sqrt{25}$

3. Using 4 rectangles: $\Delta x = 2 \Rightarrow x_i = 2i$

$$\begin{aligned} L_4 &= 2g(0) + 2g(2) + 2g(4) + 2g(6) \\ &= 2[g(0) + g(2) + g(4) + g(6)] \\ &= 2[2 + 1 + 3 + 4] = 20 \end{aligned}$$

4. Using n rectangles: $\Delta x = \frac{b-a}{n} = \frac{4-1}{n} = \frac{3}{n} \Rightarrow x_i = a + i\Delta x = 1 + \frac{3i}{n}$

So, $A = \lim_{n \rightarrow \infty} \sum_{i=1}^n \Delta x \cdot h(x_i) = \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{3}{n} \cdot h\left(1 + \frac{3i}{n}\right) = \lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{3}{n} \cdot \left(2 + \sin\left(1 + \frac{3i}{n}\right)\right)$.