

$$f(x) = 3x^2 - 10 \quad x=0 \text{ and } x=3$$

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n f\left(0 + \frac{3-0}{n}i\right) \left(\frac{3-0}{n}\right) = \sum_{i=1}^n f\left(\frac{3i}{n}\right) \left(\frac{3}{n}\right)$$

$$= \sum_{i=1}^n \left[3\left(\frac{3i}{n}\right)^2 - 10\right] \left(\frac{3}{n}\right) = \sum_{i=1}^n \left[3\left(\frac{9i^2}{n^2}\right) - 10\right] \left(\frac{3}{n}\right)$$

$$= \sum_{i=1}^n \left(\frac{27i^2}{n^2} - 10\right) \left(\frac{3}{n}\right) = \sum_{i=1}^n \frac{81i^2}{n^3} - \frac{30}{n}$$

$$= \frac{81}{n^3} \sum_{i=1}^n i^2 - \frac{1}{n} \sum_{i=1}^n 30 = \frac{81}{n^3} \left(\frac{n(n+1)(2n+1)}{6} \right) - \frac{1}{n} \cdot 30n$$

$$= \frac{27(2n^2 + 3n + 1)}{2n^2} - 30 = \frac{54n^2 + 81n + 27}{2n^2} - 30$$

$$= \lim_{n \rightarrow \infty} \frac{54n^2 + 81n + 27}{2n^2} - \lim_{n \rightarrow \infty} 30 = \frac{54}{2} - 30 = 27 - 30$$

$$= -3 \quad \text{SOA} = 3$$

