

Show all your work and circle one answer

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

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

(a) $2n^2 + 9n + 12$

(b) $n^2 + 9n + 12$

(c) $n^2 + 8n + 12$

(d) $2n^2 + 13$

(e) $2n^2 + 9n + 13$

(f) none of the above

$$= \frac{6}{n} \sum_{i=1}^n i^2 + \frac{6}{n} \sum_{i=1}^n 2i + \frac{6}{n} \sum_{i=1}^n 1$$

$$= \frac{6}{n} \left(\frac{n(n+1)(2n+1)}{6} \right) + \frac{6}{n} \left(\frac{2 \cdot n(n+1)}{2} \right) + \frac{6}{n} (n)$$

$$= (n+1)(2n+1) + 6(n+1) + 6$$

$$= 2n^2 + 3n + 1 + 6n + 6 + 6 = 2n^2 + 9n + 13$$

2)

The area under the graph of $f(x) = \frac{6}{x+1}$ from $x=0$ to $x=3$ to using three rectangles and right endpoints is approximately equal to

(a) 8

(b) 9

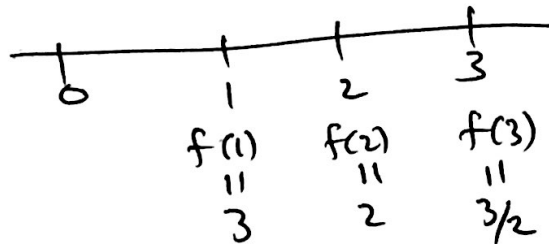
(c) 10

(d) 11

(e) 12

(f) none of the above

$$a=0, b=3, n=3, \Delta x = \frac{3}{3} = 1$$



$$R_3 = (3)(1) + (2)(1) + \left(\frac{3}{2}\right)(1)$$

$$= 5 + \frac{3}{2} = 13/2$$

3)

$$\lim_{n \rightarrow \infty} \left(\sum_{i=1}^n \sqrt{\frac{1}{n^2} - \frac{i^2}{n^4}} \right) =$$

$$R_n = \sum_{i=1}^n \sqrt{\frac{1}{n^2} - \frac{i^2}{n^4}}$$

$$a=0, b=1, \Delta x = \frac{1}{n}$$

$$x_i = i/n$$

$$= \sum_{i=1}^n \sqrt{\frac{1}{n^2} \left(1 - \frac{i^2}{n^2}\right)}$$

$$= \sum_{i=1}^n \frac{1}{n} \sqrt{1 - \frac{i^2}{n^2}} = \sum_{i=1}^n \Delta x f(x_i)$$

$$f(x) = \sqrt{1-x^2}$$

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \sqrt{\frac{1}{n^2} - \frac{i^2}{n^4}} = \int_0^1 \sqrt{1-x^2} dx = \frac{\pi}{4}$$

(a) $\frac{1}{4}$

(b) $\frac{\pi}{4}$

(c) 1

(d) $\frac{e}{2}$

(e) π

(f) none of the above