

Area Under a Curve Using Limits of Sums

Evaluate each sum.

1) $\sum_{k=1}^n 48k$

2) $\sum_{k=1}^n 16k^2$

3) $\sum_{k=1}^n (36k + 6)$

4) $\sum_{k=1}^n (k + 2)$

Evaluate each limit.

5) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{12k}{n^2}$

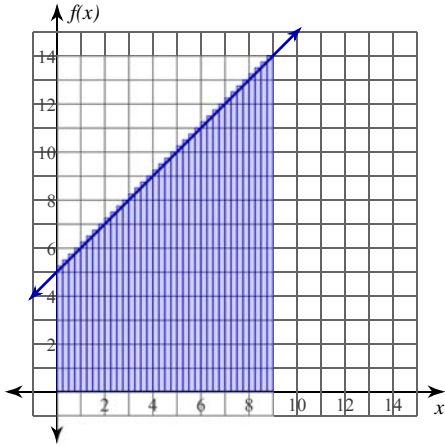
6) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{2}{n} + \frac{k^2}{n^3} \right)$

7) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{6}{n} + \frac{16k^2}{n^3} \right)$

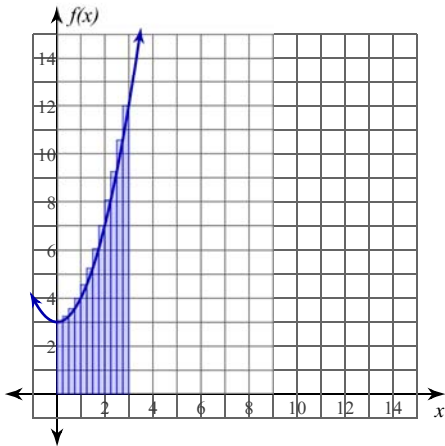
8) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{12}{n} + \frac{8k^2}{n^3} \right)$

For each problem, find the area under the curve over the given interval. Set up your solution using the limit as n goes to ∞ of the upper sum.

9) $f(x) = x + 5$; $[0, 9]$



10) $f(x) = x^2 + 3$; $[0, 3]$



Area Under a Curve Using Limits of Sums

Evaluate each sum.

1) $\sum_{k=1}^n 48k$

$$24n^2 + 24n$$

2) $\sum_{k=1}^n 16k^2$

$$\frac{16n^3}{3} + 8n^2 + \frac{8n}{3}$$

3) $\sum_{k=1}^n (36k + 6)$

$$18n^2 + 24n$$

4) $\sum_{k=1}^n (k + 2)$

$$\frac{5n}{2} + \frac{n^2}{2}$$

Evaluate each limit.

5) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{12k}{n^2}$

$$6$$

6) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{2}{n} + \frac{k^2}{n^3} \right)$

$$\frac{7}{3} \approx 2.333$$

7) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{6}{n} + \frac{16k^2}{n^3} \right)$

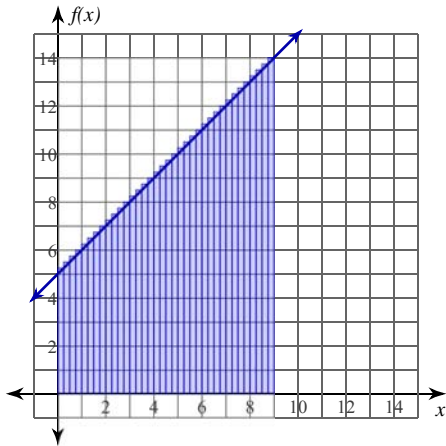
$$\frac{34}{3} \approx 11.333$$

8) $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left(\frac{12}{n} + \frac{8k^2}{n^3} \right)$

$$\frac{44}{3} \approx 14.667$$

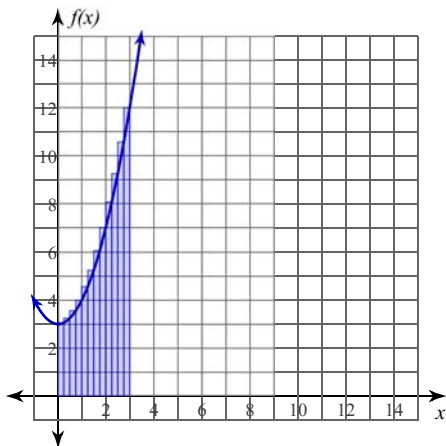
For each problem, find the area under the curve over the given interval. Set up your solution using the limit as n goes to ∞ of the upper sum.

9) $f(x) = x + 5$; $[0, 9]$



$$\frac{171}{2} = 85.5$$

10) $f(x) = x^2 + 3$; $[0, 3]$



$$18$$