

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

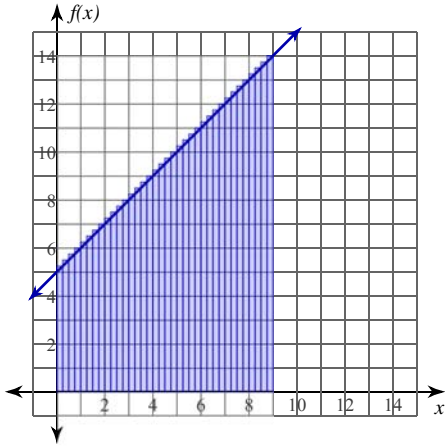
6)  $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left( \frac{2}{n} + \frac{k^2}{n^3} \right)$

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

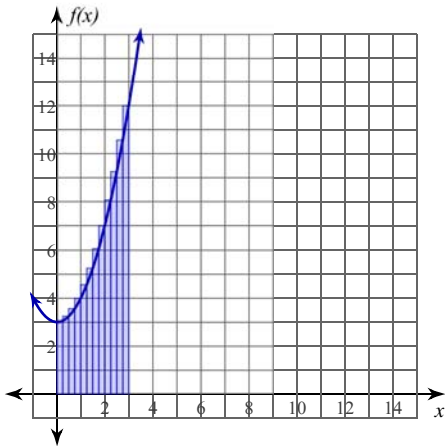
8)  $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left( \frac{12}{n} + \frac{8k^2}{n^3} \right)$

For each problem, find the area under the curve over the given interval. Set up your solution using the limit as  $n$  goes to  $\infty$  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)  $\lim_{n \rightarrow \infty} \sum_{k=1}^n \left( \frac{6}{n} + \frac{16k^2}{n^3} \right)$

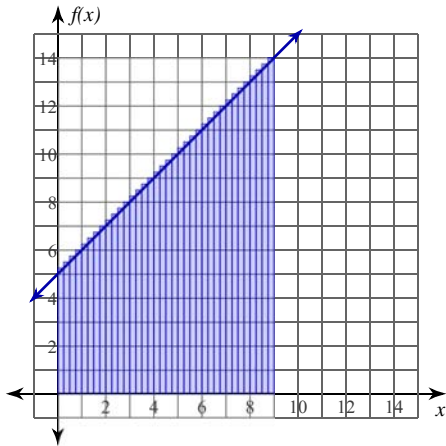
$\frac{34}{3} \approx 11.333$

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

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

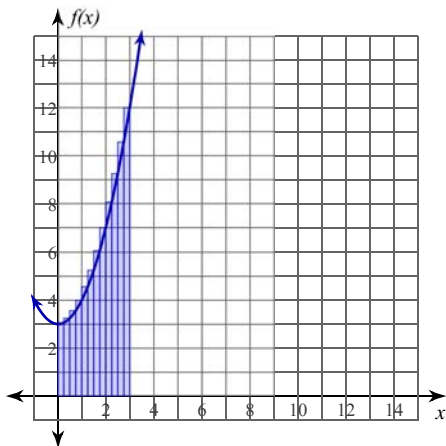
For each problem, find the area under the curve over the given interval. Set up your solution using the limit as  $n$  goes to  $\infty$  of the upper sum.

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



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

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



$$18$$