

1. Consider the graph of $f(x) = x^2 + 4$ between 2 and 6.

(a) In the space provided, sketch the graph of $f(x)$, shade in the region under $f(x)$ on the interval $[2, 6]$.

(b) Approximate the area under $f(x)$ on $[2, 6]$ using 4 rectangles and using right-hand endpoints.

(c) Approximate the area under $f(x)$ on $[2, 6]$ using 4 rectangles and using left-hand endpoints.

(d) Find the area under $f(x)$ on $[2, 5]$ using left-hand endpoints.

(e) Find the area under $f(x)$ on $[2, 5]$ using right-hand endpoints.

2. Express the following limits of sums as a definite integral on $[-2, 3]$.

(a) $\lim_{\|P\| \rightarrow 0} \left(\frac{1}{w_k} + w_k^2 + 3 \right) \Delta x_k$

(b) $\lim_{\|P\| \rightarrow 0} (\sin^2(w_k) \cos(w_k)) \Delta x_k$

3. Use geometry compute the following integrals.

(a) $\int_{-1}^3 (3x + 4) dx$

(b) $\int_{-2}^2 (5 + \sqrt{4 - x^2}) dx$

4. Compute the following integrals.

$$(a) \int x^4 - \frac{1}{\sqrt{x}} + 3dx$$

$$(b) \int 5x\sqrt{3-x^2}dx$$

$$(c) \int \sin(x) \cos^4(x)dx$$

$$(d) \int \frac{x^3 - x^2 + x}{x}dx$$

$$(e) \int (x^3 + 1)^2 dx$$

$$(f) \int \frac{1}{\cos^2(x)} dx$$