

# Examples

Complete the following on a separate page.

1) The interval  $[-3, 4]$  is partitioned into  $n$  subintervals of equal length  $\Delta x$ .

a) Create an expression for the subinterval length  $\Delta x$ .

b) If  $m_k$  represents the midpoint of the  $k^{\text{th}}$  subinterval, express

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n (2m_k^2 + 5m_k - 8)\Delta x \quad \text{as an integral.}$$

2) Use areas to evaluate the following integrals.

a)  $\int_{-9}^2 8 \, dx$

b)  $\int_{0.5}^4 (2x - 1) \, dx$

c)  $\int_{-1}^5 (x + 3) \, dx$

d)  $\int_{-3}^4 -2x \, dx$

3) Evaluate the integral  $\int_{-2}^2 \sqrt{4 - x^2} \, dx$ .

4) If  $a$ ,  $b$  and  $c$  are constants, prove algebraically that  $\int_a^b c \, dx = c(b - a)$ .

5) Use the integration function on a calculator to evaluate the following integrals.

a)  $\int_{-1}^2 x \sin x \, dx$

b)  $\int_0^1 \frac{4}{1 + x^2} \, dx$

c)  $\int_0^5 e^{-t^2} \, dt$

6) The following integrals involve functions with discontinuities. In each case, state the type of discontinuity and where it occurs, then evaluate the integral.

a)  $\int_{-1}^2 \frac{|x|}{x} \, dx$

b)  $\int_0^3 \frac{x^2 - 4}{x - 2} \, dx$

b)  $\int_0^5 \text{int}(x) \, dx$