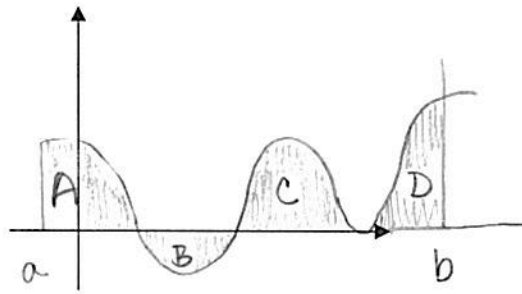
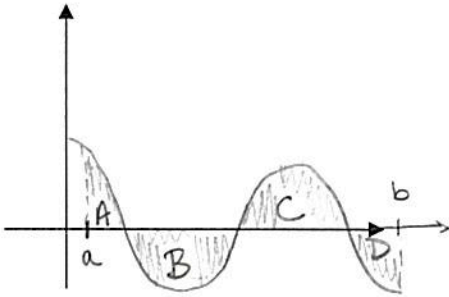


CALCULUS: WS on Integrals & Area

1. The capital letters represent actual areas. Express  $\int_a^b f(x)dx$  in terms of these letters.



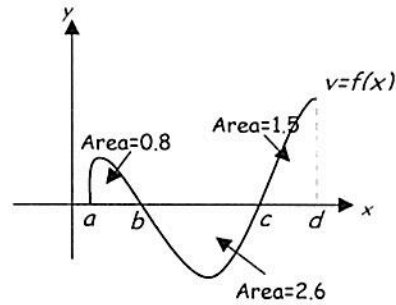
2. Use the areas shown in the accompanying figure to find

(a)  $\int_a^b f(x)dx$

(b)  $\int_b^c f(x)dx$

(c)  $\int_a^c f(x)dx$

(d)  $\int_a^d f(x)dx$



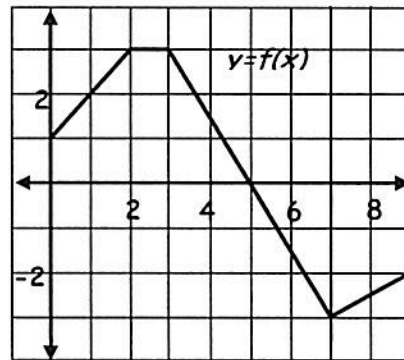
3. The graph of  $f$  is shown. Evaluate each integral by interpreting it in terms of areas.

(a)  $\int_0^2 f(x)dx$

(b)  $\int_0^5 f(x)dx$

(c)  $\int_5^7 f(x)dx$

(d)  $\int_0^9 f(x)dx$

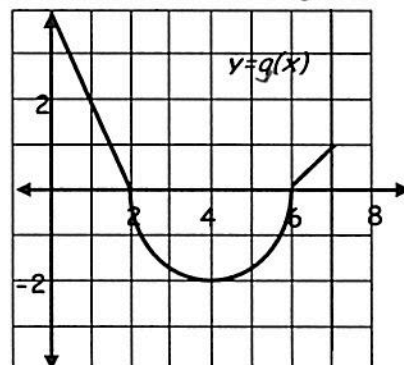


4. The graph of  $g$  consists of two straight lines and a semicircle. Use it to evaluate each integral.

(a)  $\int_0^2 g(x)dx$

(b)  $\int_2^6 g(x)dx$

(c)  $\int_0^7 g(x)dx$



5. The shaded region A has an area of 1.5, and  $\int_0^6 f(x) dx = 3.5$ . Use this information to fill in the blanks.

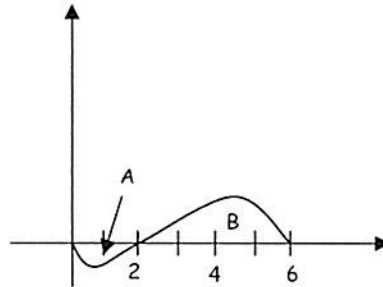
(a)  $\int_0^2 f(x) dx =$

(b)  $\int_2^6 f(x) dx =$

(c)  $\int_0^6 |f(x)| dx =$

(d)  $\int_0^2 -2f(x) dx =$

(e)  $\int_0^6 |2 + f(x)| dx =$



7. Evaluate each integral by interpreting it in terms of areas.

a.  $\int_1^3 (1 + 2x) dx$

b.  $\int_{-2}^2 \sqrt{4 - x^2} dx$

c.  $\int_{-\pi/3}^{\pi/3} \sin x dx$

d.  $\int_{-3}^0 (1 + \sqrt{9 - x^2}) dx$

e.  $\int_{-1}^3 (2 - x) dx$

f.  $\int_0^5 2 dx$

h.  $\int_0^3 |3x - 5| dx$

i.  $\int_0^{\pi} \cos x dx$

8. In each part, evaluate the integral, given that

$$f(x) = \begin{cases} 2x, & x \leq 1 \\ 2, & x > 1 \end{cases}$$

(a)  $\int_0^1 f(x) dx$

(b)  $\int_{-1}^1 f(x) dx$

(c)  $\int_1^{10} f(x) dx$

(d)  $\int_{1/2}^5 f(x) dx$