



**Properties of Definite Integrals**

1. a)  $\int_0^7 f(x) dx = 13$

c)  $\int_5^5 f(x) dx = 0$

b)  $\int_5^0 f(x) dx = -10$

d)  $\int_0^5 3f(x) dx = 30$

2. a)  $\int_2^6 [f(x) + g(x)] dx = 8$

c)  $\int_2^6 2g(x) dx = -4$

b)  $\int_2^6 [g(x) - f(x)] dx = -12$

d)  $\int_2^6 [2f(x) - 3g(x)] dx = 26$

3. a)  $\int_0^2 f(x) dx = 4$

c)  $\int_5^7 f(x) dx = -3$

b)  $\int_0^5 f(x) dx = 10$

d)  $\int_0^9 f(x) dx = 2$

4. a)  $\int_0^2 g(x) dx = 4$

c)  $\int_0^7 g(x) dx = 4.5 - 2\pi \approx -1.783$

b)  $\int_2^6 g(x) dx = -2\pi$

5. a)  $\int_0^2 f(x) dx = -\pi$

c)  $\int_{-4}^2 f(x) dx = -2\pi - 1$

e)  $\int_{-4}^2 |f(x)| dx = 2\pi + 1$

b)  $\int_2^6 f(x) dx = 4$

d)  $\int_{-4}^6 f(x) dx = 3 - 2\pi$

f)  $\int_{-4}^2 [f(x) + 2] dx = 11 - 2\pi$

6. a)  $\int_0^5 [f(x) + 3] dx = 19$

c)  $\int_{-5}^5 f(x) dx = 8$  ( $f$  is even.)

b)  $\int_{-2}^3 f(x+2) dx = 4$

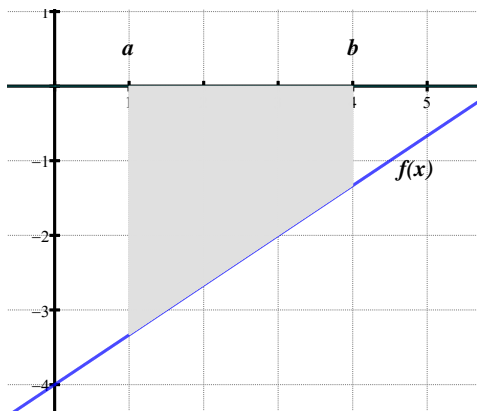
d)  $\int_{-5}^5 f(x) dx = 0$  ( $f$  is odd.)

7.  $\int_a^b [f(x) + g(x)] dx = \left[ \int_a^b f(x) dx \right] + \left[ \int_a^b g(x) dx \right]$  TRUE

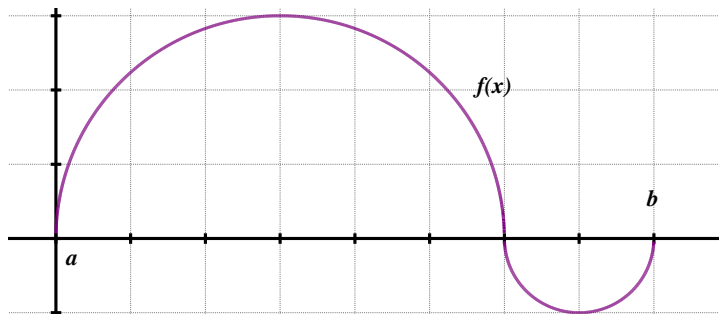
8.  $\int_a^b [f(x) \cdot g(x)] dx = \left[ \int_a^b f(x) dx \right] \cdot \left[ \int_a^b g(x) dx \right]$  FALSE: let  $f(x) = x$ ;  $g(x) = x$ ;  $a = 0$ ;  $b = 1$ .

We will have:  $\int_0^1 [x \cdot x] dx = \frac{1}{3} \neq \left[ \int_0^1 x dx \right] \cdot \left[ \int_0^1 x dx \right] = \frac{1}{4}$

9. The value of  $\int_a^b f(x) dx$  must be positive. FALSE (see below)

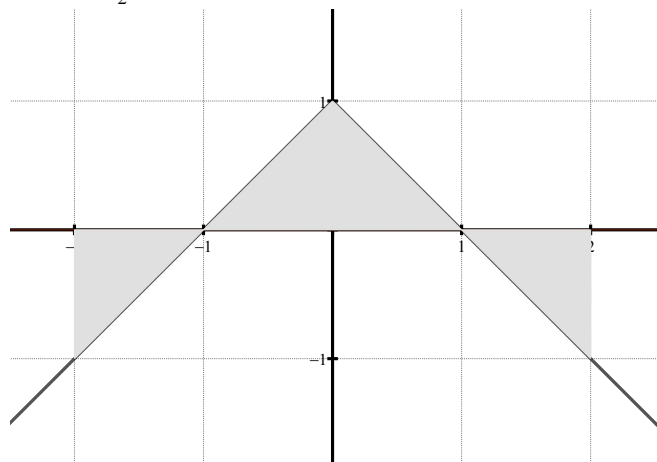


10. If  $\int_a^b f(x) dx > 0$ , then  $f$  is nonnegative for all  $x$  in  $[a, b]$ . FALSE (see below)



11.  $\int_0^2 [x] dx = 1$ .

12. a)  $\int_{-2}^2 (1 - |x|) dx = 0$



b)  $\int_0^3 |3x - 6| dx = 7.5$

