SECTION 5.2: THE DEFINITE INTEGRAL

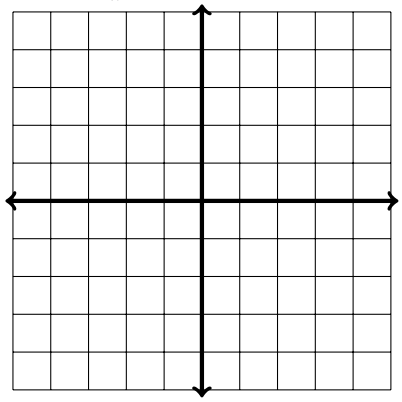
1. **Definition of the Definite Integral:** (abbreviated)

2. Evaluate the definite integrals below using the graph and geometry.

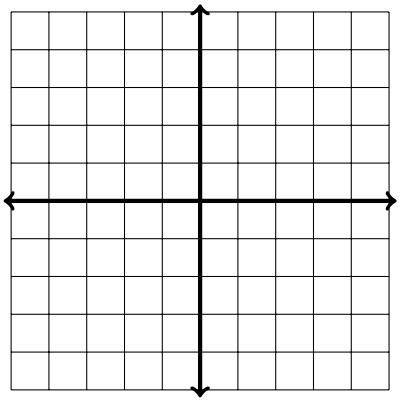
   (a) $\int_0^4 (8-2x)\,dx$ (b) $\int_0^6 (8-2x)\,dx$

3. Evaluate the following definite integrals by drawing the function and interpreting the integral in terms of areas. Shade in the area you are computing with the integral.

   (a) $\int_{-\pi}^{\pi} \sin(x)\,dx =$_____



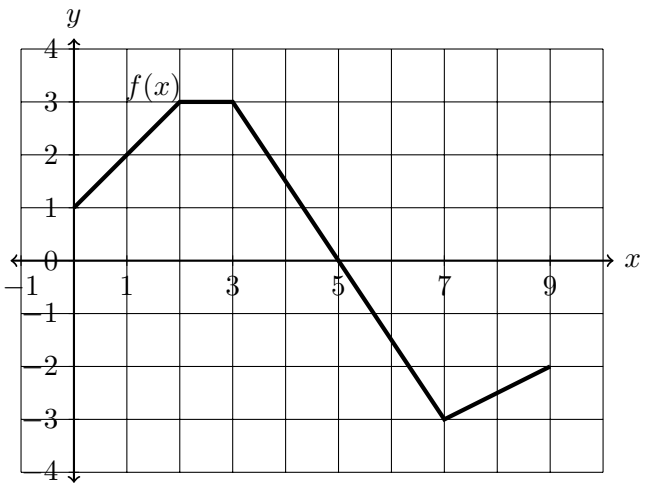
   (b) $\int_{-4}^{4} \sqrt{16-x^2}\,dx =$ _____



Properties of the Definite Integral:

- $\int_a^b f(x)\,dx =$ _____
- $\int_a^a f(x)\,dx =$ _____
- $\int_a^b c\,dx =$ _____
- $\int_a^b cf(x)\,dx =$ _____
- $\int_a^b [f(x) \pm g(x)]dx =$ _____
- $\int_a^b f(x) + \int_b^c f(x)\,dx =$ _____
- $\int_b^a f(x)\,dx =$ _____

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



(a) $\int_0^3 8f(x)dx =$

(b) $\int_2^9 f(x)dx =$

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

5. Using the fact that $\int_0^1 x^2dx = \frac{1}{3}$ and $\int_1^2 x^2\,dx = \frac{7}{3}$, evaluate the following using the properties of integrals.

(a) $\int_0^1 5x^2\,dx$ (b) $\int_0^1 (4 + 3x^2)\,dx$ (c) $\int_0^2 x^2\,dx$.