Properties of Definite Integrals

$$\int_a^a f(x)\,dx = 0.$$

$$\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx.$$

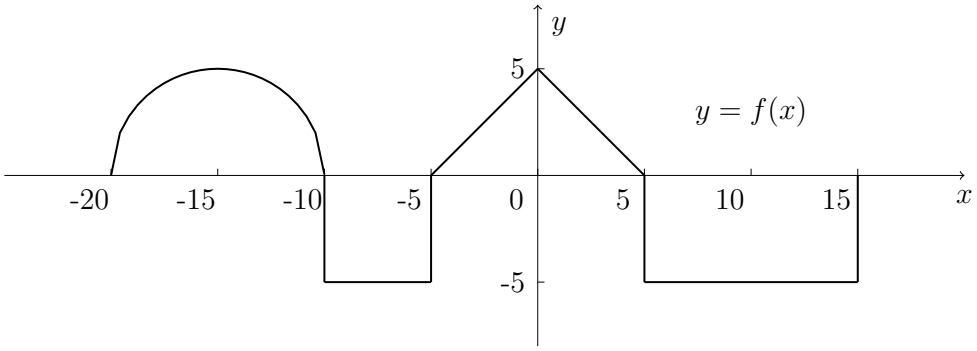
$$\int_a^b \big[f(x) \pm g(x)\big]\,dx = \int_a^b f(x)\,dx \pm \int_a^b g(x)\,dx.$$

$$\int_a^b cf(x)\,dx = c\int_a^b f(x)\,dx.$$

$$\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)\,dx.$$

MAT 191
Properties of Definite Integrals: Practice Problems

1. Use the properties of integrals to find the exact values of the expressions requested below. The figure shown is for the function $f(x)$. Shapes that look to be semicircles are semicircles. Shapes that look to be squares are squares. Pay very close attention to the syntax and notation!



(a) $\int_{-20}^{5} f(x)dx$

(b) $\int_{-10}^{5} |f(x)|dx$

(c) $\int_{-5}^{-5} 3f(x)dx + \int_{-5}^{-20} 4f(x)dx - 7\int_{-5}^{15} f(x)dx$

(d) $\int_{0}^{15} (f(x)+2)dx$

2. Evaluate the definite integrals by interpreting them geometrically.

(a) $\int_1^4 (2x+3)\,dx$

(b) $\int_0^{2\pi} 3\sin x\,dx$

(c) $\int_{-1}^{2} |x|\,dx$

(d) $\int_{-3}^{3} \sqrt{9-x^2}\,dx$