

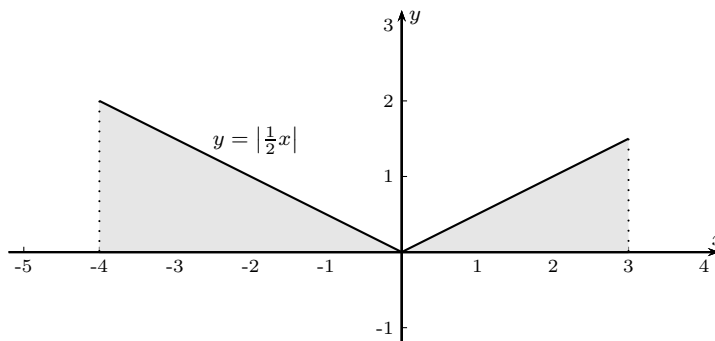
Calculus I, Section 5.2, #39  
The Definite Integral

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Evaluate the integral by interpreting it in terms of areas.<sup>1</sup>

$$\int_{-4}^3 \left| \frac{1}{2}x \right| dx$$

First, let's sketch the graph of the integrand over the interval indicated by the integral.



Since the function is nonnegative for the entire interval  $-4 \leq x \leq 3$ , the value of the integral is equal to the value of the shaded area. Using the formula for the area of a triangle, we get

$$\begin{aligned} \int_{-4}^3 \left| \frac{1}{2}x \right| dx &= \frac{1}{2} \cdot 4 \cdot 2 + \frac{1}{2} \cdot 3 \cdot \frac{3}{2} \\ &= 4 + \frac{9}{4} \\ &= \frac{25}{4} \end{aligned}$$

Thus,

$$\int_{-4}^3 \left| \frac{1}{2}x \right| dx = \frac{25}{4}$$

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<sup>1</sup>Stewart, *Calculus, Early Transcendentals*, p. 390, #39.