

Properties of Definite Integrals

p. 354 - 364 (5.2)

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$$1. \int 0 dx = C$$

$$2. \int k dx = kx + C$$

$$3. \int (kf(x)) dx = k \int (f(x)) dx$$

$$4. \int x^n dx = \frac{x^{(n+1)}}{n+1} + C, n \neq -1 \text{ (called the power rule)}$$

$$5. \int [f(x) \pm g(x)] dx = \int (f(x)) dx \pm \int (g(x)) dx$$

$$1. \int (-6x^3) dx = -\frac{6}{4}x^4 + C = \boxed{-\frac{3}{2}x^4 + C}$$

$$2. \int ((x^2 - 10x^4) dx = \boxed{\frac{x^3}{3} - 2x^5 + C}$$

$$3. \int \frac{\sqrt{x}}{4} dx = \frac{1}{4} \int x^{1/2} dx = \frac{1}{4} \cdot \frac{2}{3} x^{3/2} + C = \boxed{\frac{1}{6} x^{3/2} + C}$$

$$4. \int \frac{x^2 + 3}{x^2} dx = \int \frac{x^2}{x^2} dx + \int \frac{3}{x^2} dx = \int dx + 3 \int x^{-2} dx$$
$$= x + \frac{3x^{-1}}{-1} + C$$
$$= \boxed{x - \frac{3}{x} + C}$$