

Integration

(1) Find the length of the following curve:

$$y = \frac{1}{3} (x^2 + 2)^{\frac{3}{2}} \text{ from } x = 0 \text{ to } x = 3$$

(2) Find the length of the following curve:

$$x = \frac{y^3}{3} + \frac{1}{4y} \text{ from } y = 1 \text{ to } y = 3$$

(3) Find the length of the following curve:

$$y = \frac{x^2}{2} - \frac{\ln x}{4} \text{ from } x = 1 \text{ to } x = 3$$

(4) Find the area of a surface of revolution for the following curve:

$$y = 2\sqrt{x}, 1 \leq x \leq 2$$

(5) Evaluate the following indefinite integral:

$$\int_1^{\infty} \frac{\ln x}{x^2} dx$$

(6) Evaluate the following indefinite integral:

$$\int_0^{\infty} e^{-\frac{x}{2}} dx$$

(7) Use integration by parts to find the following integral:

$$\int (\ln x)^2 dx$$

(8) Use integration by parts to find the following integral:

$$\int_0^{0.5\pi^2} \cos \sqrt{2x} dx$$

(9) Use integration by parts or trigonometric integration to find the following integral:

$$\int_{\frac{\pi}{2}}^{\pi} \sin^4 x \, dx$$

(10) Evaluate the following definite integral:

$$\int_1^3 x \sqrt{3x^2 - 2} \, dx$$

(11) Evaluate the following definite integral:

$$\int_0^2 \frac{x}{\sqrt{x^2 + 5}} \, dx$$

(12) Evaluate the following definite integral:

$$\int_0^2 x e^{x^2} \, dx$$

(13) Evaluate the following definite integral:

$$\int_1^2 \frac{\ln x}{x} \, dx$$

(14) Evaluate the following integral.

$$\int_0^{\frac{\pi}{6}} 3 \cos^5 3x \, dx$$