

7.4

(19)

$$L = \int_1^4 \sqrt{1 + \frac{1}{4x}} dx$$

$$S = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx$$

$$\frac{1}{4x} = \left(\frac{dy}{dx}\right)^2$$

$$\pm \sqrt{\frac{1}{4x}} = \frac{dy}{dx}$$

$$\frac{1}{2} x^{-1/2}$$

$$\frac{1}{2\sqrt{x}} = \frac{dy}{dx}$$

$$x^{1/2} + C = y$$

$$1^{1/2} + C = 1$$

$$C = 0$$

$$\boxed{y = \sqrt{x}}$$

$$\frac{-1}{2\sqrt{x}}$$

$$-x^{1/2} + C = y$$

$$-(1)^{1/2} + C = 1$$

$$-1 + C = 1$$

$$C = 2$$

$$-\sqrt{x} + 2 = y$$

(27)

$$y = x^3 + 5|x| \text{ From } x = -2 \text{ to } x = 1$$

$$\begin{cases} x^3 + 5(-x) & x < 0 \\ x^3 + 5x & x > 0 \end{cases}$$

$$\int_{-2}^0 \sqrt{1 + (3x^2 - 5)^2} dx + \int_0^1 \sqrt{1 + (3x^2 + 5)^2} dx \approx 13.132$$

7.4
① $y = \frac{1}{3} (x^2 + 2)^{3/2}$

$$\frac{dy}{dx} = \frac{1}{2} (x^2 + 2)^{1/2} [2x]$$

$$= x (x^2 + 2)^{1/2}$$

$$s = \int_0^3 \sqrt{1 + (x(x^2 + 2)^{1/2})^2} dx = 12$$