

$$13. \int_0^4 \sqrt{x} dx = \int_0^4 x^{1/2} dx = \left[ \frac{x^{3/2}}{3/2} \right]_0^4 = \left[ \frac{2x^{3/2}}{3} \right]_0^4 = \frac{2(4)^{3/2}}{3} - 0 = \frac{2 \cdot 8}{3} = \frac{16}{3}$$

$$14. \int_{\pi}^{2\pi} \cos \theta d\theta = [\sin \theta]_{\pi}^{2\pi} = \sin 2\pi - \sin \pi = 0 - 0 = 0$$

$$15. \int_{-1}^0 (2x - e^x) dx = [x^2 - e^x]_{-1}^0 = (0 - 1) - (1 - e^{-1}) = -2 + 1/e$$

$$16. \int_0^1 x^{3/7} dx = \left[ \frac{x^{10/7}}{10/7} \right]_0^1 = \left[ \frac{7}{10} x^{10/7} \right]_0^1 = \frac{7}{10} - 0 = \frac{7}{10}$$

$$17. \int_1^2 \frac{3}{t^4} dt = 3 \int_1^2 t^{-4} dt = 3 \left[ \frac{t^{-3}}{-3} \right]_1^2 = \frac{3}{-3} \left[ \frac{1}{t^3} \right]_1^2 = -1 \left( \frac{1}{8} - 1 \right) = \frac{7}{8}$$

$$18. \int_1^4 \frac{1}{\sqrt{x}} dx = \int_1^4 x^{-1/2} dx = \left[ \frac{x^{1/2}}{1/2} \right]_1^4 = [2x^{1/2}]_1^4 = 2\sqrt{4} - 2\sqrt{1} = 4 - 2 = 2$$

$$19. \int_1^2 \frac{x^2 + 1}{\sqrt{x}} dx = \int_1^2 (x^{3/2} + x^{-1/2}) dx = \left[ \frac{x^{5/2}}{5/2} + \frac{x^{1/2}}{1/2} \right]_1^2 = \left[ \frac{2}{5} x^{5/2} + 2x^{1/2} \right]_1^2 \\ = \left( \frac{2}{5} \cdot 4\sqrt{2} + 2\sqrt{2} \right) - \left( \frac{2}{5} + 2 \right) = \frac{18}{5}\sqrt{2} - \frac{12}{5}$$

$$20. \int_0^2 (x^3 - 1)^2 dx = \int_0^2 (x^6 - 2x^3 + 1) dx = \left[ \frac{1}{7} x^7 - 2\left(\frac{1}{4} x^4\right) + x \right]_0^2 = \left( \frac{128}{7} - 2 \cdot 4 + 2 \right) - 0 = \frac{86}{7}$$

$$21. \int_{\pi/4}^{\pi/3} \sin t dt = [-\cos t]_{\pi/4}^{\pi/3} = \left( -\cos \frac{\pi}{3} \right) - \left( -\cos \frac{\pi}{4} \right) = -\frac{1}{2} + \frac{\sqrt{2}}{2} = \frac{\sqrt{2}-1}{2}$$