

$$1a. \frac{2}{7}x^{\frac{7}{2}} + C \quad \left(\frac{5}{2}x^{\frac{5}{2}} \rightarrow \int nx^a = \frac{nx^{a+1}}{a+1} \right)$$

$$b. -\frac{1}{6x^2} + C$$

$$c. -2 \cos(2x+1) + C$$

$$d. -\frac{T}{2} \ln \left| \cos \left(\frac{2x}{T} \right) \right| + C \quad \text{Solved in last assignment.}$$

$$2. a. 2\pi$$

$$b. 0$$

$$c. \frac{2\sqrt{3} - 4\sqrt{2}}{2}$$

$$d.$$

$$\int_B^A B-A$$

$$3. a. x \sinh(x) - \cosh(x) + 3 \sinh(x) + C$$

$$b. \frac{e^{x \sin(x)}}{2} + \frac{e^{x \cos(x)}}{2} + C$$

$$4. \int \sin x \cos x dx$$

$$v = \sin x$$

$$v dv$$

$$= \frac{v^{1+1}}{1+1}$$

$$= \frac{\sin^{1+1} x}{1+1}$$

$$\rightarrow \frac{1}{2} \sin^2 x + C$$

$$v = \cos x$$

$$v dv = dv = -\sin x dx$$

$$= \frac{(\cos(x))(-\sin(x)) dx}{v dv}$$

$$= \frac{v^2}{2} + C$$

$$= \frac{\cos^2 x}{2} + C$$

$$5. a. v = -4x^2$$

$$3 \int -\frac{e^v}{8} dv = 3 \left(-\frac{e^v}{8} \right)$$

$$= -\frac{3}{8} e^{-4x^2} = -\frac{3}{8} e^{-4x^2} + C$$

$$b.$$

$$v = x^4 + 3$$

$$\int \frac{\sec(u)}{4} du$$

$$\frac{1}{4} \int \sec(u) du$$

$$v = \tan\left(\frac{u}{2}\right)$$

$$\frac{1}{4} \int \frac{1}{v} dv$$

$$= \frac{1}{4} \ln|v|$$

$$= \frac{1}{4} \ln \left| \tan \left(\frac{x^4+3}{2} \right) \right| + C$$

6.

$$= \frac{1}{b-a} \int_a^b f(x) dx$$

$$[a, b]$$

$$= \frac{1}{4-1} \int_1^4 x^2 dx$$

$$= \frac{1}{3} \left[\frac{x^3}{3} \right]_1^4$$

$$= \frac{1}{3} \cdot \left(\frac{4^3}{3} - \frac{1^3}{3} \right)$$

$$= \frac{1}{3} \cdot 21$$

$$= 7$$