

Sec 5.3 day 2 page 362 (2-14 even, 51-57, 59)

$$\textcircled{2} \int_1^2 x^{-2} dx = -x^{-1} \Big|_1^2 = \frac{-1}{2} - (-1) = \left(\frac{1}{2}\right)$$

$$\textcircled{4} \int_0^1 \left(1 + \frac{1}{2}u^4 - \frac{2}{3}u^9\right) du = \left[u + \frac{u^5}{10} - \frac{u^{10}}{25}\right]_0^1$$
$$= 1 + \frac{1}{10} - \frac{1}{25} - 0 - 0 + 0 = \left(\frac{53}{50}\right)$$

$$\textcircled{6} \int_1^8 x^{1/3} dx = \frac{3x^{4/3}}{4} \Big|_1^8 = \frac{3(8)^{4/3}}{4} - \frac{3(1)^{4/3}}{4}$$
$$= \frac{3(16)}{4} - \frac{3}{4} = 12 - \frac{3}{4} = \left(11\frac{1}{4}\right)$$

$$\textcircled{8} \int_{-5}^5 e dx = ex \Big|_{-5}^5 = (5e) - (-5e)$$
$$= \left(10e\right)$$

$$\textcircled{10} \int_0^2 (y-1)(2y+1) dy = \int_0^2 (2y^2 - y - 1) dy$$
$$= \left[\frac{2y^3}{3} - \frac{y^2}{2} - y\right]_0^2 = \frac{2(2)^3}{3} - \frac{2^2}{2} - 2$$
$$= \frac{16}{3} - 2 - 2 = \frac{16}{3} - 4 = \left(\frac{4}{3}\right)$$

$$\begin{aligned}
 (12) \quad \int_{-1}^1 t(1-t)^2 dt &= \int_{-1}^1 t(1-2t+t^2) dt \\
 &= \int_{-1}^1 t - 2t^2 + t^3 dt = \left[\frac{t^2}{2} - \frac{2t^3}{3} + \frac{t^4}{4} \right]_{-1}^1 \\
 &= \frac{1}{2} - \frac{2}{3} + \frac{1}{4} - \left(\frac{1}{2} + \frac{2}{3} + \frac{1}{4} \right) \\
 &= \left(\frac{-4}{3} \right)
 \end{aligned}$$

$$\begin{aligned}
 (14) \quad \int_0^{\pi/4} \sec \theta \tan \theta d\theta & \quad \sec \theta = \frac{1}{\cos \theta} \quad \tan \theta = \frac{\sin \theta}{\cos \theta} \\
 \int_0^{\pi/4} \frac{\sin \theta}{\cos^2 \theta} d\theta &= \left[\frac{1}{\cos \theta} \right]_0^{\pi/4} \\
 &= \frac{1}{\cos^{\pi/4}} - \frac{1}{\cos(0)} = \sqrt{2} - 1 \approx (4142)
 \end{aligned}$$

(51) It represents the child's growth from 5yrs to 10yrs of age.

(52) It represents the change in the charge Q from time $t=a$ to $t=b$.

(53) It represents the number of gallons of oil that leaked from the tank in the first 2 hours (120min)

(54) It represents the total bee population after 15 weeks.

(55) It represents the increase in revenue when production is increased from 1000 units to 5000 units.

(56) It represents the change in elevation from 3 to 5 miles from the start of the trail.

(57) newton-meters

$$(59) \text{ Displacement} = \int_0^3 (3t-5) dt = \left[\frac{3}{2}t^2 - 5t \right]_0^3 = \frac{27}{2} - 15 = \boxed{-3/2 \text{ m}}$$

$$b) \text{ Distance traveled} = \int_0^3 |3t-5| dt$$

$$= \int_0^{5/3} (5-3t) dt + \int_{5/3}^3 (3t-5) dt$$

$$= \frac{25}{3} - \frac{3 \cdot 25}{2 \cdot 9} + \frac{27}{2} - 15 - \left(\frac{3 \cdot 25}{2 \cdot 9} - \frac{25}{3} \right) = \boxed{\frac{41}{6} \text{ m}}$$