Anwer

1 $0 < x < \frac{2}{3}$

2 $\frac{2\pi}{3}, \frac{4\pi}{3}, \frac{8\pi}{3}$

3 $\frac{1}{5}\left(xe^{5x} - \frac{1}{5}e^{5x}\right) + C_2$

4(a) $e^3 + \frac{7}{2e^2} - \frac{9}{2}$ (b) $2\sqrt{3} - \frac{\pi}{6}$

5 $\frac{x^2}{2} - 3x + 8\ln(x+2) - \ln(x+1) + C$

6(i) 1 real root (ii) -0.5

7(ii) $y = \sin 2x + 2\cos x$

8(ii) 0.761 m, – 15.8 (reject)

9(ii) $\frac{5}{24}$

10(a) $x = \frac{e}{e-2}$ (b) 0.1

11(ii) abnormal reading $y = 6.24$, correct $y = 5.30$

(iii) $a = 1.42$, $b = 1.50$

12(ii) $r = 2.53$ (iii) $V = 339\ \text{cm}^3$, V is maximum

13(i) $a = 8$, $c = 5$, $b = \frac{\pi}{6}$ (ii) 3.42 s

(iii) It is th duration of time that bucket is in the water.

14(a) no x^9 term (b)(i) $256 - \frac{1024}{x} + \frac{1792}{x^2} + \cdots$

(c) $a = 1$, $b = 0.5$, $c = -128$

15(ii) $S = 2\pi\left[\sqrt{5}sin(2\theta - 26.6°) + 1\right]$

(iii) max $s = 20.3\ \text{cm}^2$ when $\theta = 58.3^0$