Ch. 9 p 1. Answers

1) a) $\int x\sqrt{x}\,dx = \int x \cdot x^{\frac{1}{2}}\,dx = \int x^{\frac{3}{2}}\,dx = \frac{1}{\frac{3}{2}+1} x^{\frac{3}{2}+1} = \frac{2}{5} x^{\frac{5}{2}} + C$

$= \frac{2 \cdot x^{\frac{5}{2}}}{5} + C$

b) $\int \frac{1}{\sqrt{x}}\,dx = \int x^{-\frac{1}{2}}\,dx = \frac{1}{1-\frac{1}{2}} x^{-\frac{1}{2}+1} = 2\sqrt{x} + C$

c) $\int 3e^{-2x}\,dx = 3\int e^{-2x}\,dx = 3\left(\frac{1}{-2} e^{-2x} + C\right) =$

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

d) $\int (x-1)(x+2)\,dx = \int (x^2 + x - 2)\,dx = \frac{1}{3}x^3 + \frac{x^2}{2} - 2x + C$

e) $\int (e^{3x} - e^{2x} + e^x)\,dx = \frac{1}{3}e^{3x} - \frac{1}{2}e^{2x} + e^x + C$

2) $C(x) = \int 3x + 4 = \frac{3}{2}x^2 + 4x + \underline{40}$. $\underline{C(0) = C = 40}$

3) a) $\int_0^2 3x^2\,dx = x^3\Big|_0^2 = 2^3 - 0^3 = 8$ b) $\int_1^{10} \frac{1}{x^2}\,dx = -\frac{1}{x}\Big|_1^{10} =$

4) a) $\int_1^2 (2x + x^2)\,dx = x^2 + \frac{1}{3}x^3\Big|_1^2 =$ $= -\frac{1}{10} - \left(-\frac{1}{1}\right) = 0.9$

$= 2^2 + \frac{2^3}{3} - \left(1^2 + \frac{1^3}{3}\right) = \frac{16}{3} = 5.3$

b) $\int_{-2}^{3} \left(\frac{1}{2}x^2 - \frac{1}{3}x^3\right)\,dx = \frac{1}{2}\cdot\frac{1}{3}x^3 - \frac{1}{3}\cdot\frac{1}{4}x^4\Big|_{-2}^{3} = \frac{3^3}{6} - \frac{3^4}{12} -$

$- \left(\frac{(-2)^3}{6} - \frac{(-2)^4}{12}\right) = \frac{5}{12} = 0.416.$