

ANSWERS TO PRACTICE PROBLEMS

a) $x^3 + \cos x + c$ b) $x + 8x^{1/2} + 4\ln|x| + c$

c) $\frac{3}{4} \sin(2x^2 + 1) + c$ d) $3x^2 + \frac{1}{x^2} - 5x + c$

e) $\frac{1}{12} (x^4 - 6x)^6 + c$ f) $\frac{2}{3} x^3 + \frac{1}{10} e^{5x^2 + 1} + c$

g) $e^x - \frac{x^{e+1}}{e+1} + c$ h) $\frac{(x+1)^6}{6} - \frac{4(x+1)^5}{5} + c$

i) $-\sin(\cos x) + c$

j) $\frac{(1 + \ln(5x))^2}{2} + c$ OR $\ln x + \frac{(\ln(5x))^2}{2} + c$

OR $\ln 5x + \frac{(\ln(5x))^2}{2} + c$

2) a) $f(x) = 2x^{3/2} - 2x^{1/2} + 6$

b) $f(x) = e^x - x^2 + 1$

3) $f(t) = \frac{t^3}{3} - t^2 + 3t + \left(\sqrt{2} - \frac{14}{3}\right)$

4) 67) ~~\$~~ 3370

68) a) $R(x) = \int R'(x) = -0.0045x^2 + 12x + c$
 BUT $0 = R(0) = c$

$\therefore R(x) = -0.0045x^2 + 12x$

68 b) LET PRICE PER UNIT BE p .

THEN $R(x) = px$

$$\Rightarrow -0.0045x^2 + 12x = px \Rightarrow \boxed{p = -0.0045x + 12}$$

$$69) P(x) = \int P'(x) dx = -0.002x^2 + 20x + C, \quad C = -16000$$

$$\Rightarrow P(x) = -0.002x^2 + 20x - 16000$$

AND SO $P(5000) = 34000$

$$70) C(x) = 0.001x^2 + 100x + 4000$$

5) a) 10 b) $\frac{365}{2}$ c) 62

6 a) $\frac{34}{3}$ b) $\frac{46}{15}$ c) 2 d) $\frac{112}{15}$ e) $5 + \ln 2$

f) 20

$$7) 41) C(300) - C(0) = \int_0^{300} C'(x) dx = 3300$$

$$C(300) = 3300 + C(0) = 3300 + 800 = \$4100$$

$$42) a) R(200) = \int_0^{200} R'(x) dx = \$600 \quad (R(0) = 0)$$

$$b) R(300) = R(200) + \int_{200}^{300} R'(x) dx = \$1500$$

$$43) a) P(200) - P(0) = \int_0^{200} P'(x) dx = \$3600$$

$$P(200) = 3600 + P(0) = 3600 - 800 = \$2800$$

$$b) P(200) - P(0) = \int_0^{200} P(x) dx = \$219.20$$

$$8) a) \frac{11}{2} \quad b) 1 \quad c) \frac{1}{4}e^4 - \frac{1}{4} = \frac{1}{4}(e^4 - 1)$$