

$$\int x^n = \frac{1}{n+1} x^{n+1}$$

QUESTION 3

a) $\int_0^1 \frac{1}{x+4} dx$

$$= [\ln(x+4)]_0^1$$

$$= [\ln(5) + \ln(0)]$$

$$= \ln 5$$

$$= 1.61 \text{ (2 dec. pl.)}$$

b) $S = kM^{\frac{2}{3}}$

$$18600 = k(70)^{\frac{2}{3}}$$

$$1095.08 = k$$

hence $M = 60 \text{ kg}$

~~$$x = 1095.08$$~~

$$S = 1095.08438 \times (60)^{\frac{2}{3}}$$

$$= 16783.46979...$$

$$\therefore S = 16783.47 \text{ cm}^2 \text{ (2 dec. pl.) or } 16800 \text{ cm}^2$$

c) i) $y = \ln(x^2 - 9)$

$$y_1 = \frac{1}{x}(x^2 - 9) - 2 \ln(x^2 - 9)$$

ii) $y = \frac{x}{e^x}$

$$y_1 = \frac{e^x - xe^x}{e^{2x}} = \frac{e^x(1-x)}{e^{2x}} = \frac{(1-x)}{e^x}$$



$$\begin{aligned} \text{b)} \quad x^2 &= 13^2 + 7^2 - 2(13)(7) \cos 60^\circ \\ &= 169 + 49 - 442 \cos 60^\circ \\ &= 169 + 49 - 221 \\ &= \end{aligned}$$

$$x^2 - 7x = 120$$

$$x(x-7) = 120$$

$$\text{d)} \quad \cancel{x^2 = 13^2}$$

$$13^2 = x^2 + 7^2 - 2(x)(7) \cos 60^\circ$$

$$13^2 = x^2 + 49 - 14x \cos 60^\circ$$

$$169 = x^2 + 49 - 14x \cos 60^\circ$$

$$120 = x^2 - 14x \cos 60^\circ \quad \text{here } \cos 60^\circ = \frac{1}{2}$$

$$= x^2 - 14x \left(\frac{1}{2}\right)$$

$$\therefore 120 = x^2 - 7x$$