



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

$$\ln(5) - \ln(4)$$

$$= \ln \frac{5}{4}$$

$$= 0.223143551$$

$$\doteq 0.22 \text{ (2 dp)}$$

$$b) M = 20 - S = 18600$$

$$18600 = k(20)^{2/3}$$

$$\therefore k = \frac{18600}{20^{2/3}}$$

$$= 1095.08438$$

$$\therefore S = \left( \frac{18600}{20^{2/3}} \right) \cdot 60^{2/3}$$

$$= 16783.46979$$

$$\doteq 16783 \text{ cm}^2$$

$$c) i) \frac{dy}{dx} = \frac{2x}{x^2-9} \quad \frac{d}{dx}(x^2-9) = 2x$$

$$ii) \frac{vu' - uv'}{v^2} = \frac{e^x \cdot 1 - x \cdot e^x}{e^{2x}}$$

$$\therefore \boxed{\frac{(1-x)}{e^x}}$$

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



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

$$x^2 = 218 - 91$$

$$x^2 = 127$$

$$\therefore x = \sqrt{127}$$

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

$$~~(\sqrt{127})^2 - 7(\sqrt{127}) = 8~~$$