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

$= \left[\log_e(x+4)\right]_0^1$

$= \log_e(1+4) - (\log_e(0+4)$

$= \log_e 5 - \log_e 4$

$= \log_e\left(\frac{5}{4}\right)$

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

When $M = 70$, $k = ?$, $S = 18600$

$\therefore 18600 = k70^{\frac{2}{3}}$

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

$= 1095.08438$

$= 1095.08$ (to 2dp)

$\therefore$ To find S when $M = 60$,

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

$= 16783.469...$ (by calc)

$= 16783 \text{ cm}^2$ (to nearest cm^2)

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

$\therefore f'(x) = \dfrac{2x}{x^2-9}$

(ii) $f(x) = \dfrac{x}{e^x}$

$\therefore f'(x) = \dfrac{u'v + v'u}{v^2}$

$= \dfrac{1(e^x) + e^x(x)}{(e^x)^2}$

$= \dfrac{e^x(1+x)}{e^{2x}}$

(d) $a^2 = b^2 + c^2 - 2bc\cos A$

~~$\therefore x^2 = 7^2 + 13^2 - 2\times 7\times 13$~~

$\therefore 13^2 = x^2 + 7^2 - 2\times x\times 7\times \cos 60$

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

$= x^2 + 49 - \dfrac{14x}{2}$

$= x^2 + 49 - 7x$

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

~~$\therefore x^2 - 7x - 120 = 0$~~ (d) continued next page..

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$\therefore x^2 - 7x - 120 = 0$

$(x-15)(x+8) = 0$

$\therefore x = -8$ or 15

But a distance cannot be negative,

$\therefore x = 15$ cm