

a) i. show $\angle ADC = 2\theta$. $\theta = 36^\circ$.

$\triangle ACD$ is isosceles.

$\therefore \angle OAC = \angle ADC$

$\therefore 180^\circ (\Sigma \text{ of } \Delta) - 36 (\text{sum of } \theta)$

$$= 144^\circ$$

$$144 \div 2 (\text{isosceles } \Delta)$$

$$= 72$$

$$\therefore 72 = 2 \times 36$$

$$\therefore 72 = 2\theta.$$

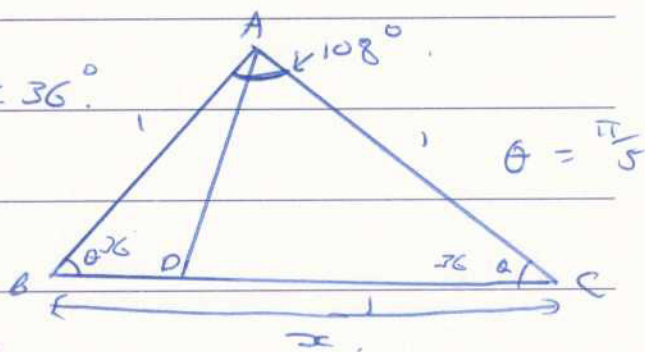
ii $x^2 - x - 1 = 0$.

iii $\cos \frac{\pi}{5} = \frac{1 + \sqrt{5}}{4}$.

$$\cos A = \frac{b^2 + c^2 - a^2}{\sqrt{b^2 + c^2}}$$

$$\cos \frac{\pi}{5} = \frac{1 + 1 - a^2}{\sqrt{1 + 1}}$$

$$\cos \frac{\pi}{5} = \frac{2 - a^2}{\sqrt{2}}$$



$$b) \quad \frac{dV}{dt} = 2e^t + 2e^{-t} \quad t = \ln r.$$

$$i) \quad \text{rate} = 0.$$

$$2e^0 + 2e^{-0}$$

$$= 2 + 2$$

$$= 4 \text{ liter/hr}$$

$$ii) \quad V = 2e^t - 2e^{-t}$$

$$V = 2e^t - 2e^{-t}$$

$$iii) \quad V = 3 \quad 2e^t - 2e^{-t} = 3$$

$$2e^t - \frac{2}{e^t} = 3$$

$$2e^{2t} - 2 = 3e^t$$

$$2e^{2t} - 3e^t - 2 = 0$$

$$iv) \quad 2e^{2t} - 3e^t - 2 = 0$$

$$e^t(2e^t - 3) - 2 = 0$$

$$e^t(2e^t - 3) = 2$$