

(a)

$$(iii) \quad x^2 - x - 1 = 0$$

$$x = \frac{-B \pm \sqrt{B^2 - 4ac}}{2a}$$

$$= \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-1)}}{2a}$$

$2a$

$$= \frac{1 \pm \sqrt{1+4}}{2}$$

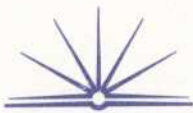
2

$$= \frac{1 \pm \sqrt{5}}{2}$$

2

$$x = \frac{1 \pm \sqrt{5}}{2}$$

2



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

$$\cos \frac{\pi}{5} = \frac{\left(\frac{1+\sqrt{5}}{2}\right)^2 + 1^2 - 1^2}{2}$$

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

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

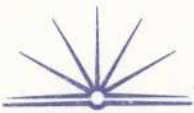
$$(b) \frac{dV}{dt} = 2e^t + 2e^{-t}$$

(i) when $t=0$

$$\frac{dV}{dt} = 2e^0 + 2e^0$$
$$= 4 \text{ cm/s}^{-1}$$

$$(ii) V = \int 2e^t + 2e^{-t}$$

$$V = \frac{2e^t}{1} - \frac{2e^{-t}}{1} + C$$



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

(iii) When ~~At t=0~~ $t=0$ & $V=0$

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

$$0 = 2 - 2 + C$$

$$C = 0$$

in which ~~V=0~~

At ~~t=0~~

At ~~t=0~~

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

(iv) when $V=3$

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