

$$9a) \angle BAC = \frac{3\pi}{5} \\ = 108^\circ$$

I In $\triangle ABC$, $\angle ABC = \angle ACB = \theta$ given,

~~so sum~~ ~~sum~~

$$2\theta + 108^\circ = 180^\circ \quad \triangle \text{ sum } \triangle$$

$$2\theta = 72$$

$$\theta = 36^\circ$$

II In $\triangle ACD$, it is isosceles so $\angle CAD = \angle ADC = y^\circ$

$$2y^\circ + \theta = 180$$

$$2y^\circ + 36^\circ = 180$$

$$2y = 144$$

$$y = 72^\circ$$

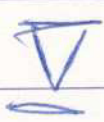
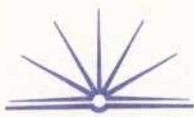
$\therefore \angle DAC = 72^\circ$ and $\angle ADC = 72^\circ$

III $\angle BAC = \angle BAD + \angle DAC$

$$108^\circ = \angle BAD + 72^\circ$$

$$\therefore \angle BAD = 36^\circ$$

IV $\angle BDA = 180^\circ - (36 \times 2)$ $\triangle \text{ sum } \triangle$
 $= 108^\circ$



$$\angle ADC = 72^\circ$$

as previously

shown

and $\theta = 36^\circ$ also shown.

$$2\theta = 72^\circ$$

$$\therefore \angle ADC = 2\theta$$

Show $\triangle DBA \parallel \triangle ABC$.

$$\text{Angle } \angle BAC = 108^\circ = \angle BDA$$

Show in p IV
and
before
I.

Angle $\angle ABC$ common.

$$\text{Angle } \angle BCA = 36^\circ = \angle BCA$$

as in III and $\theta = 36^\circ$.

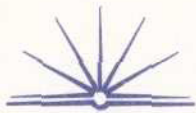
$\therefore \triangle DBA \parallel \triangle ABC$ because they are
equiangular.

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

expression for x

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

$$\cos \frac{\pi}{5} \rightarrow 36^\circ$$



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

$$\text{when } t=0, \frac{dV}{dt} = 2 + 2 \\ = 4$$

∴ enters at 4 ms^{-1} .

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

* not constant since
tank is initially
empty