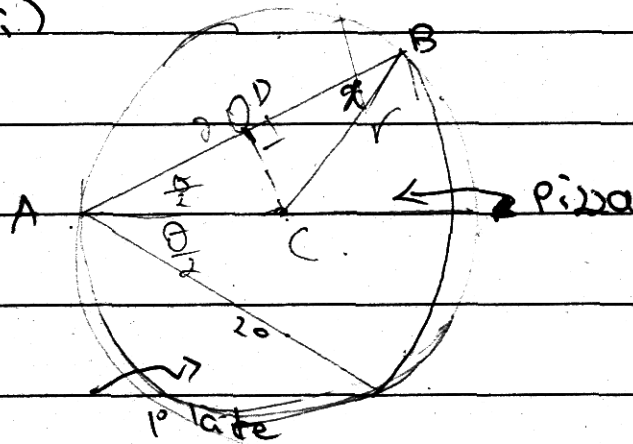


Question 10.

a) ;)



$$CA = CB \quad (\text{equal radii})$$

$$\therefore \angle x = \frac{\theta}{2} \quad \text{angles in the isosceles triangle are equal}$$

$$CD \perp AB \quad \therefore AD = DB = 10$$

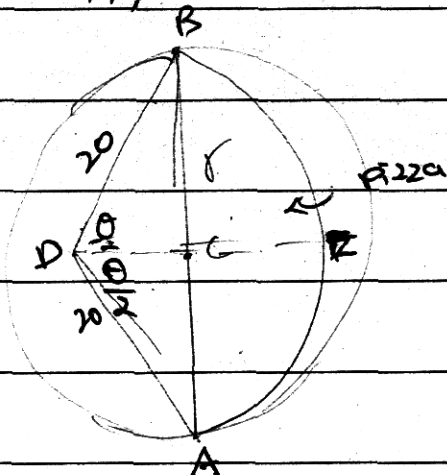
$$\cos \frac{\theta}{2} = \frac{DB}{r}$$

$$\cos \frac{\theta}{2} = \frac{10}{r}$$

$$\frac{10}{\cos \frac{\theta}{2}} = r$$

$$r = 10 \sec \frac{\theta}{2}$$

ii)



~~draw a line to the point E~~

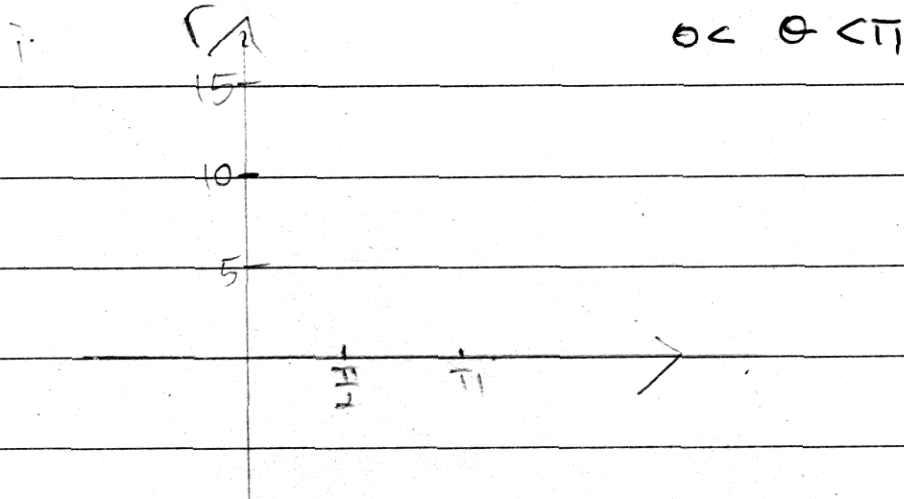
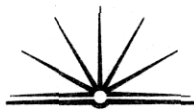
~~AB = CA = CB (equal radii of sector)~~

Given $DC \perp AB$

$$20^2 = r^2 + 10^2$$

$$\sin \frac{\theta}{2} = \frac{r}{20}$$

$$r = 20 \sin \frac{\theta}{2}$$



$$b) \quad 1 = \frac{1}{b^2 + (x+8)^2} + \frac{1}{b^2 + (x-8)^2}$$

$$\frac{dI}{dx} = \frac{2 \times [(x+8)(b^2 + (x-8)^2)^2 + (x-8)(b^2 + (x+8)^2)^2]}{(b^2 + (x+8)^2)^2 (b^2 + (x-8)^2)^2}$$

$$I = \frac{b^2 + (x-8)^2 + b^2 + (x+8)^2}{b^2 + (x+8)^2 \cdot (b^2 + (x-8)^2)}$$

$$\frac{dI}{dx} = \frac{2b^2 + (x-8)^2 + (x+8)^2}{2(b^2 + (x+8)^2) \cdot (b^2 + (x-8)^2)}$$

$$\frac{dI}{dx} = \frac{2(x-8) + 2(x+8)}{2(x-8)(b^2 + (x+8)^2) + 2(x+8)(b^2 + (x-8)^2)}$$

$$\frac{dI}{dx} = \frac{2(x-8)(b^2 + (x+8)^2) + 2(x+8)(b^2 + (x-8)^2)}{[b^2 + (x+8)^2]^2 (b^2 + (x-8)^2)^2}$$

ii)