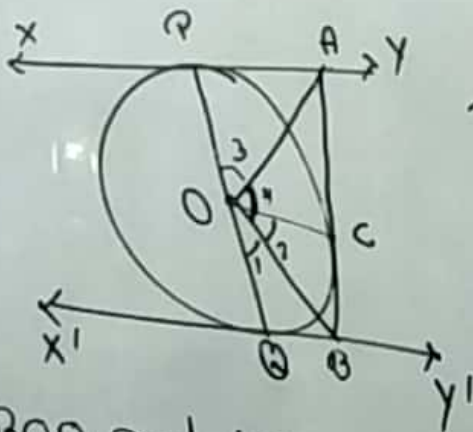


Circle

9



$$\angle 1 = \angle 2$$

Similarly $\angle 3 = \angle 4$

by Linear pair

$$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 180$$

$$\angle 2 + \angle 2 + \angle 4 + \angle 4 = 180$$

$$2\angle 2 + 2\angle 4 = 180$$

$$2(\angle 2 + \angle 4) = 180$$

$$\therefore \boxed{\angle AOB = 90}$$

In $\triangle BOQ$ and $\triangle BOS$

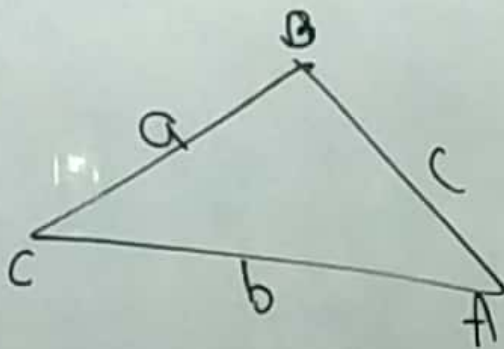
$BQ = BS$ (Tangent)

$OQ = OS$ (Radius)

$OB = OB$ (Common)

by SSS $\triangle BOQ \cong \triangle BOS$

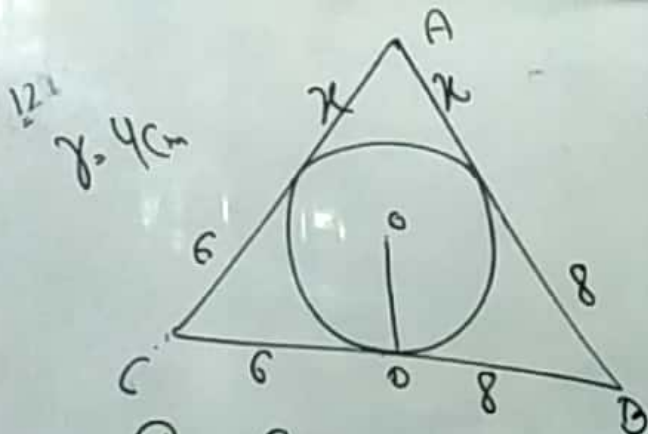
Heron's
formula



Semi perimeter

$$S = \frac{a+b+c}{2}$$

$$A = \sqrt{S(S-a)(S-b)(S-c)}$$



$$a = 6 + x$$

$$b = 8 + x$$

$$c = 6 + 8 = 14$$

$$s = \frac{a+b+c}{2} = \frac{6+x+8+x+14}{2}$$

$$= \frac{28+2x}{2} = \frac{2(14+x)}{2} = 14+x$$

Area

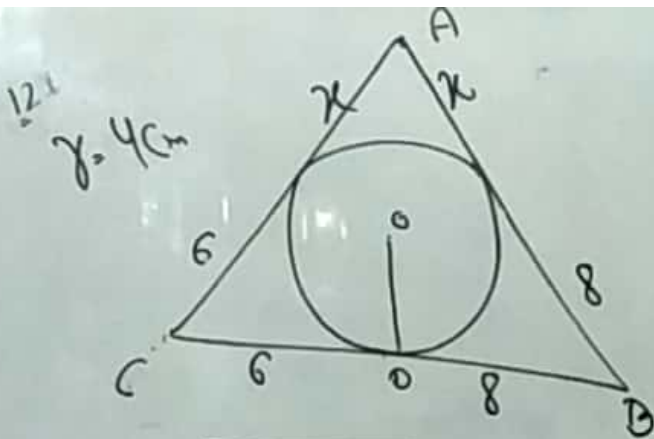
$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{(14+x)(14+x-6-x)(14+x-8-x)(14+x-14)}$$

$$= \sqrt{(14+x) \times 8 \times 6 \times x}$$

$$A = \sqrt{48x(14+x)}$$

Radius of incircle $r = \frac{A}{s}$



$$4 = \frac{\sqrt{48x(14+x)}}{14+x}$$

squaring both

$$16 = \frac{48x(14+x)}{(14+x)^2}$$

$$14+x = 3x$$

$$14 = 2x$$

$$x = 7$$

$$AB = 8 + x = 8 + 7 = 15$$

$$AC = 6 + x = 6 + 7 = 13$$

A