

3a) * Since $OC = OB = 3\text{cm}$ (radii of (S))

$\frac{1}{2}$ then $\triangle OCB$ is isosceles at O (for having 2 equal sides)

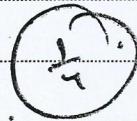
• $[OR] \parallel [AC]$ (given)

$[AC] \perp [CB]$ (proved)

$\frac{1}{2}$) thus $[OR] \perp [BC]$ since if two straight lines are parallel then every straight line perpendicular to one is also perpendicular to the other.

thus $[OR]$ is the height relative to the base $[BC]$ in the isosceles triangle OBC thus $[OR]$ is the bisector of the main angle (Rule)

so $[OR]$ is the bisector of \hat{COB} .



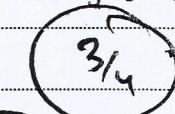
b) In the two triangles COD and $OB D$ we have

S. $CO = OB$ (radii of (S))

A. $\hat{COD} = \hat{DOB}$ (O, R, D are collinear & $[OR]$ is the bisector of \hat{COB})

S. $[OD]$ common side

so they are congruent by SAS (rule)



c) $\hat{DOB} = \hat{COD} = 90^\circ$ (homologous elements & $[OB]$ is a radius of the circle (S)) thus $(DR) \perp (OB)$ at B so (BD) is a tangent to (S) at B.



d) $\triangle OCD$ and $\triangle OBD$ are two right triangles at C and B respectively having a common hypotenuse $[OD]$ (proved)



so they are inscribed in a circle whose diameter is $[OD]$ thus O, D, B and C belong to the same circle whose diameter is $[OD]$

