

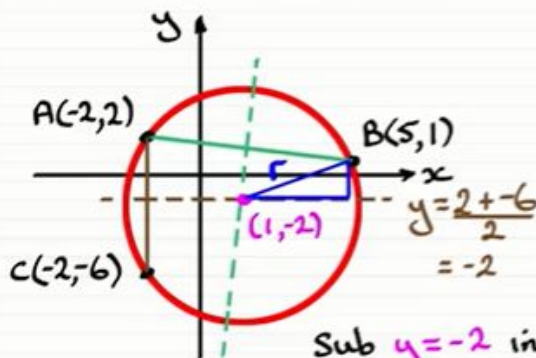


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Equation of a Circle passing through 3 points

Find the equation of the circle passing through the points $A(-2,2)$, $B(5,1)$ and $C(-2,-6)$.



$$\begin{aligned} \text{Mid-point of } AB &= \left(\frac{-2+5}{2}, \frac{2+1}{2} \right) \\ &= \left(\frac{3}{2}, \frac{3}{2} \right) \end{aligned}$$

$$\text{Gradient } AB = \frac{2-1}{-2-5} = -\frac{1}{7}$$

$$\therefore \text{ perp. gradient} = 7$$

$$\begin{aligned} \therefore \text{ Equation of perp. bisector } AB \text{ is} \\ y - \frac{3}{2} = 7\left(x - \frac{3}{2}\right) \quad \textcircled{1} \end{aligned}$$

$$\text{Sub } y = -2 \text{ in } \textcircled{1} \Rightarrow -2 - \frac{3}{2} = 7x - \frac{21}{2} \Rightarrow x = 1$$

Centre $(1, -2)$

$$\begin{aligned} r^2 &= (5-1)^2 + (1-2)^2 = 16 + 9 = 25 \\ \therefore r &= 5 \end{aligned}$$

$$\therefore \text{ Equation of the circle is } (x-1)^2 + (y+2)^2 = 25$$

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