Plane Geometry

Circle

Prove that the radii of the circles

$x^2 + y^2 = 1$

$x^2 + y^2 - 2x - 6y - 6 = 0$

$x^2 + y^2 - 4x - 12y - 9 = 0$ are in A.P.

Proof :

Given eq. are

$x^2 + y^2 = 1 \quad \longrightarrow (1)$

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$x^2 + y^2 - 2x - 6y - 6 = 0$ — ②

$x^2 + y^2 - 4x - 12y - 9 = 0$ — ③

r_1 = Radius of ① = 1.

r_2 = Radius of ② $= \sqrt{g^2 + f^2 - c}$

$= \sqrt{(-1)^2 + (-3)^2 - (-6)}$

$= \sqrt{1 + 9 + 6}$

$= \sqrt{16} = 4$

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$$r_2 = 4.$$

$$r_3 = \text{Radius of } ③ = \sqrt{g^2 + f^2 - c}$$

$$= \sqrt{(-2)^2 + (-6)^2 - (-9)}$$

$$= \sqrt{4 + 36 + 9}$$

$$= \sqrt{49} = 7$$

$$r_3 = 7$$

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$r_1, r_2, r_3 = 1, 4, 7$

Hence radii are in A.P.

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