

POSITION OF A POINT $P(x_1, y_1)$ w.r.t. CIRCLE

Circle : $S = x^2 + y^2 + 2gx + 2fy + C = 0$

$$r = \sqrt{g^2 + f^2 - C}$$

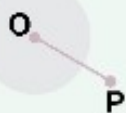
$$P \equiv (x_1, y_1), O \equiv (-g, -f)$$

$$S_1 = x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + C$$

Method I

$$S_1 > 0$$

Point
lie outside Circle



$$S_1 = 0$$

Point lie
on the Circle



$$S_1 < 0$$

Point lie
inside Circle



Step I

Find distance
OP using
distance
formula

$$OP > r$$

Step II

Find radius
using
 $r = \sqrt{g^2 + f^2 - C}$

$$OP = r$$

$$OP < r$$

Method II