

EXERCISE 11.1

In each of the following Exercises 1 to 5, find the equation of the circle with

1. Centre (0, 2) and radius 2.

Sol. Here $h = 0$, $k = 2$ and $r = 2$.

Equation of circle is $(x - h)^2 + (y - k)^2 = r^2$

$$\text{i.e., } (x - 0)^2 + (y - 2)^2 = 2^2$$

$$\text{or } x^2 + y^2 - 4y + 4 = 4$$

$$\text{or } x^2 + y^2 - 4y = 0.$$

2. Centre (- 2, 3) and radius 4.

Sol. Here $h = - 2$, $k = 3$ and $r = 4$.

Equation of circle is $(x - h)^2 + (y - k)^2 = r^2$

$$\text{i.e., } (x + 2)^2 + (y - 3)^2 = 4^2$$

$$\text{or } x^2 + 4x + 4 + y^2 - 6y + 9 = 16$$

$$\text{or } x^2 + y^2 + 4x - 6y - 3 = 0.$$

3. Centre $\left(\frac{1}{2}, \frac{1}{4}\right)$ and radius $\frac{1}{12}$.

Sol. We know that the equation of the circle with centre at (h, k) and radius r is given by

$$(x - h)^2 + (y - k)^2 = r^2 \quad \dots(i)$$

Here $(h, k) = \left(\frac{1}{2}, \frac{1}{4}\right)$ and $r = \frac{1}{12}$

Putting values of h , k and r in (i),

\therefore Equation of the required circle is

$$\left(x - \frac{1}{2}\right)^2 + \left(y - \frac{1}{4}\right)^2 = \left(\frac{1}{12}\right)^2$$

$$\text{or } x^2 + \frac{1}{4} - x + y^2 + \frac{1}{16} - \frac{1}{2}y = \frac{1}{144}$$

$$\text{or } x^2 + y^2 - x - \frac{1}{2}y + \frac{11}{36} = 0$$

$$\left[\because \frac{1}{4} + \frac{1}{16} - \frac{1}{144} = \frac{36 + 9 - 1}{144} = \frac{11}{36} \right]$$

Multiplying by 36, we have

$$36x^2 + 36y^2 - 36x - 18y + 11 = 0.$$

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