

Practice Questions

Q3. Find the equation of the circle having (1, -2) as its centre and passing through

$$3x + y = 14, 2x + 5y = 18$$

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S3. First don't get stressed that you have solved this problem in less page, I have just tried to give a detailed step wise solution; that is why it seems too lengthy. Solving the given equations,

$$3x + y = 14$$

$$2x + 5y = 18$$

Multiplying the first equation by 5, we get

$$15x + 5y = 70$$

$$2x + 5y = 18$$

Subtract equations, we get $13x = 52$. Therefore $x = 4$
Substituting $x = 4$, in first equation, we get

$$3(4) + y = 14$$

$$y = 14 - 12 = 2$$

So, the point of intersection is (4, 2).

Since, the equation of a circle having centre (h, k), having radius as r units, is

$$(x - h)^2 + (y - k)^2 = r^2$$

Putting the values of (4, 2) and centre co-ordinates (1,-2) in the above expression, we get

$$(4 - 1)^2 + (2 - (-2))^2 = r^2$$

$$3^2 + 4^2 = r^2$$

$$r^2 = 9 + 16 = 25$$

$$r = 5$$

units

So, the expression is

$$(x - 1)^2 + (y - (-2))^2 = 5^2$$

Expanding the above equation we get general form of circle

$$x^2 - 2x + 1 + (y + 2)^2 = 25$$

$$x^2 - 2x + 1 + y^2 + 4y + 4 = 25$$

$$x^2 - 2x + y^2 + 4y - 20 = 0$$

Hence the required expression is

$$x^2 - 2x + y^2 + 4y - 20 = 0.$$