

Q4. The equation of the circle in the first quadrant touching each coordinate axis at a distance of one unit from the origin is:

1. $x^2 + y^2 - 2x - 2y + 1 = 0$
2. $x^2 + y^2 - 2x - 2y - 1 = 0$
3. $x^2 + y^2 - 2x - 2y = 0$
4. $x^2 + y^2 - 2x + 2y - 1 = 0$

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Sol) One way to solve is to simply write every equation in centre radius form and then see which one gives a circle touching both the axes with its centre (1, 1) and radius one unit. Clearly, this points to **option A**.

$$x^2 + y^2 - 2x - 2y + 1 = 0$$

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

Another approach is to get centre and radius of circles by comparing them with the general form of circle. This approach is quick because all the options are given in general form of particular circles. This gives following centre and radius,

- 1) (1,1) and 1
- 2) (1,1) and $3^{1/2}$
- 3) (1,1) and $2^{1/2}$
- 4) (1,-1) and $3^{1/2}$

This approach also gives **option (A)**