Related Problems with solutions

Q1) Find the centre and radius of the circle $x^2 + y^2 - 2x + 4y = 8$

Q2) The equation of the circle which passes through the point (4, 5) and has its centre at (2, 2) is ___

Q3) Circle on which the coordinates of any point are $(2 + 4\cos\theta, -1 + 4\sin\theta)$ where θ is parameter is given by $(x-2)^2 + (y + 1)^2 = 16$.

Solutions

Q1) If one knows general form of circle and its centre and radius formulas then it is an easy one. Compare with $x^2 + y^2 + 2gx + 2fy + c = 0$.

$$\text{centre} = (-g, -f) = (1, -2)$$

Using radius formula,

$$r = (g^2+f^2-c)^{1/2} = (13)^{1/2}$$

Q2) As the circle is passing through the point (4, 5) and its centre is (2,2) so its radius is

$$r^2 = (4 - 2)^2 + (5 - 2)^2 = 13$$

Therefore the required answer is, in centre-radius form

$$(x-2)^2 + (y-2)^2 = 13$$

Q3) This is a question based on parametric form and centre-radius form of circles. Recall parametric form from class notes.

$$x = 2 + 4\cos\theta \Rightarrow (x-2) = 4\cos\theta$$

$$y = -1 + 4\sin\theta \Rightarrow y + 1 = 4\sin\theta$$

Now square both equations and we get,

$$(x-2)^2 + (y + 1)^2 = 16$$

It is a true statement