



Coordinate Geometry – The Circle Questions

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The Circle

Question 1

A circle has centre (2,3) and contains the point (8,9)

- Sketch the circle
- Find the radius length of the circle
- Write down the equation of the circle

Question 2

The line segment joining A(-5,3) and B(5,-3) is the diameter of a circle

- Sketch the circle
- Find the centre of the circle
- Find the radius length of the circle
- Write down the equation of the circle
- Using the formula $\text{Area} = \pi r^2$ find the area of the circle. Give your answer correct to two decimal places.
- Find the area of the square in which the circle can be inscribed

Question 3

The equations of two circles are:

$$c_1 : x^2 + y^2 - 6x - 10y + 29 = 0$$

$$c_2 : x^2 + y^2 - 2x - 2y - 43 = 0$$

- Write down the centre and radius-length of each circle.
- Prove that the circles are touching.



- c) Verify that (4, 7) is the point that they have in common.
- d) Find the equation of the common tangent.

Question 4

A circle passes through the point (3,3) and the point (4,1).

If the centre of the circle is on the line $x + 3y = 12$, find its equation.

NB: Draw a rough sketch of the circle and the line above

Question 5

The line $3x - 4y + 14 = 0$ is tangent to a circle at the point

(-2, 2). The circle also contains the point (5,1)

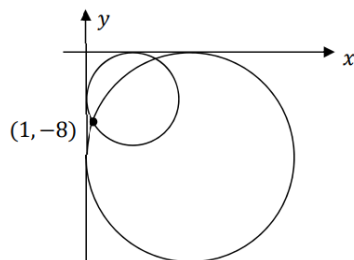
- a) Draw a rough sketch of the circle.
- b) Find the equation of the circle.

Question 6

(a) The circle c has equation $x^2 + y^2 - 2x + 8y + k = 0$. The radius of c is $5\sqrt{3}$. Find the value of k .

(b) The circle $(x - 5)^2 + (y + 2)^2 = 20$ has a tangent at the point (9, -4). Find the slope of this tangent.

(c) Two circles each have both the x -axis and the y -axis as tangents, and each contains the point (1, -8) as shown in the diagram below. Find the equation of **each** of these circles.



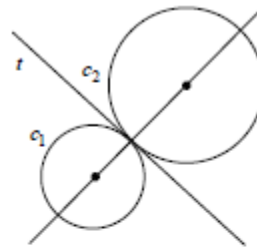
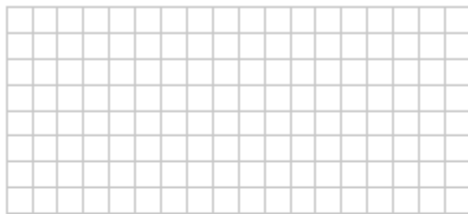


Question 7

- (a) Draw the circle $c: x^2 + y^2 = 25$. Show your scale on both axes.
- (b) Verify, using algebra, that $A(-4, 3)$ is on c .
- (c) Find the equation of the circle with centre $(-4, 3)$ that passes through the point $(3, 4)$.

Question 8

The circles c_1 and c_2 touch externally as shown.



(a) Complete the following table:

Circle	Centre	Radius	Equation
c_1	$(-3, -2)$	2	
c_2			$x^2 + y^2 - 2x - 2y - 7 = 0$

- (b) (i) Find the co-ordinates of the point of contact of c_1 and c_2 .
- (ii) Hence, or otherwise, find the equation of the tangent, t , common to c_1 and c_2 .

Question 9

The centre of a circle lies on the line $x + 2y - 6 = 0$. The x -axis and the y -axis are tangents to the circle. There are two circles that satisfy these conditions. Find their equations.