



Name: _____ **Date:** _____ **Score:** _____ / 63

- 1** The circle C has equation $(x - 3)^2 + (y + 5)^2 = 20$
- Write down the coordinates of the centre of C .
 - Find the radius of C , giving your answer as a simplified surd. (2 marks)

Answer _____

- 2** The circle C has equation $x^2 + y^2 - 8x + 6y + 9 = 0$. Find the coordinates of the centre of C and the radius of C . (3 marks)

Answer _____

- 3** A circle has centre $(-2, 1)$ and passes through the point $(1, 5)$. Find an equation for the circle. (3 marks)

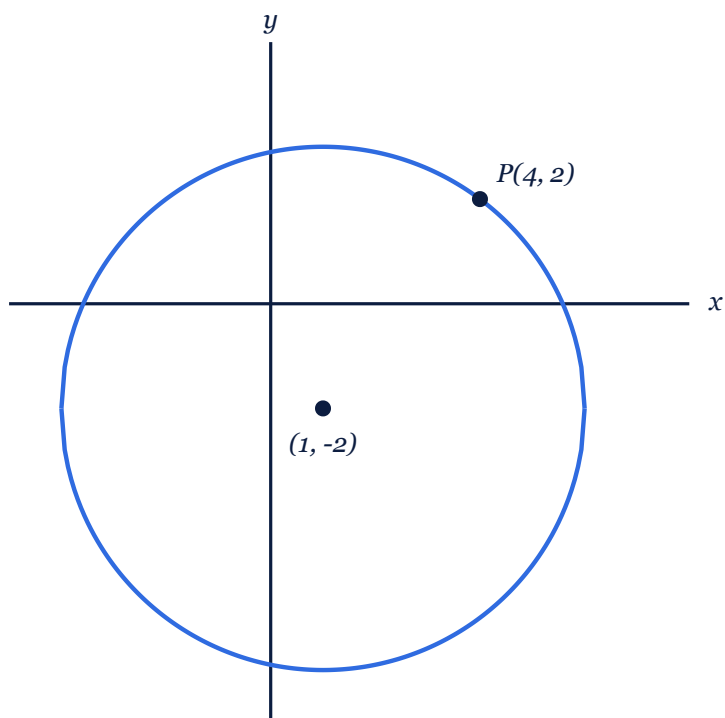
Answer _____

- 4** The points $A(-1, 4)$ and $B(5, -2)$ are the ends of a diameter of the circle C .
- Find an equation for C .
 - Determine, giving a reason, whether the origin lies inside or outside C . (5 marks)

Answer _____

5

The circle C has equation $(x - 1)^2 + (y + 2)^2 = 25$. The point $P(4, 2)$ lies on C . Find an equation of the tangent to C at P , giving your answer in the form $ax + by + c = 0$, where a , b and c are integers.



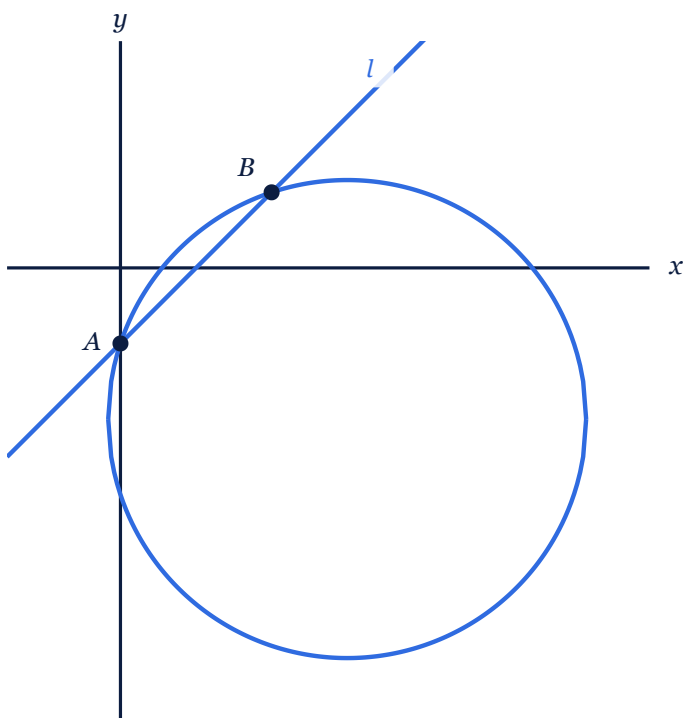
(4 marks)

Answer

6

The circle C has equation $x^2 + y^2 - 6x + 4y + 3 = 0$. The line l with equation $y = x - 1$ meets C at the points A and B .

- Find the coordinates of A and B .
- Find the exact length of the chord AB .
- Show that the perpendicular bisector of AB passes through the centre of C .



(7 marks)

Answer _____

7

The circle C has equation $(x - 1)^2 + (y - 2)^2 = 5$. The line l has equation $y = 2x + k$, where k is a constant.

- Show that the x coordinates of any points where l meets C satisfy $5x^2 + (4k - 10)x + k^2 - 4k = 0$
- Given that l is a tangent to C , find the possible values of k .

(6 marks)

Answer _____

8

The points $P(-2, 4)$, $Q(4, 6)$ and $R(6, 0)$ lie on the circle C .

- Show that angle PQR is a right angle.
- Hence find an equation for C .

(6 marks)

Answer _____

- 9 The points $A(7, 5)$, $B(-1, 5)$ and $D(5, -1)$ lie on the circle C .
- Find the equation of the perpendicular bisector of AD .
 - Hence, or otherwise, find the coordinates of the centre of C .
 - Find an equation for C .

(7 marks)

Answer _____

- 10 The circle C has equation $x^2 + y^2 - 4x + 2y - 4 = 0$ and centre M . The point P has coordinates $(8, 7)$. A line from P touches C at the point T .
- Find the centre and radius of C .
 - Find the exact length of PT .
 - Find the size of angle MPT , giving your answer in degrees to 1 decimal place.

(5 marks)

Answer _____

11

The equation $x^2 + y^2 - 2kx + 4y + 2k + 4 = 0$, where k is a constant, represents a circle C .

- Find, in terms of k , the coordinates of the centre of C and an expression for the square of its radius.
- Hence find the set of possible values of k .
- Given that C touches the x -axis, find the exact possible values of k .

(7 marks)

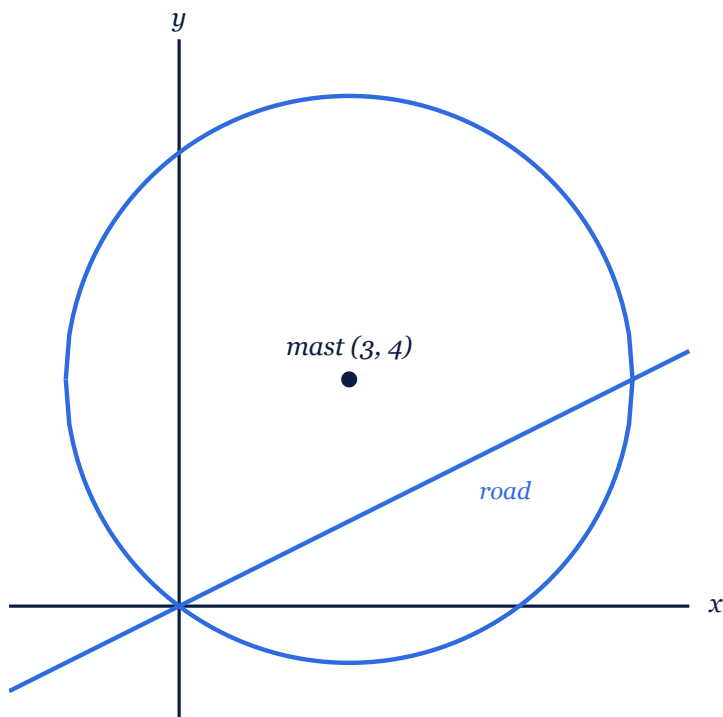
Answer

12

A mobile phone mast in rural Cumbria has coordinates $(3, 4)$ relative to a fixed origin O , where the units are kilometres. The mast gives a signal everywhere within 5 km of it, and the boundary of this region is modelled as a circle.

A straight road through a village at O is modelled by the line with equation $y = \frac{1}{2}x$

- Write down an equation for the boundary circle.
- Find the coordinates of the points where the road meets the boundary.
- Find the exact length of road that has a signal.
- A van travels along the road at a constant 60 km/h. Find, to the nearest minute, how long the van has a signal.
- Give one reason why the circle may not be a good model for the region with a signal.



(8 marks)

Answer _____

End of questions | Total 63 marks