

6.

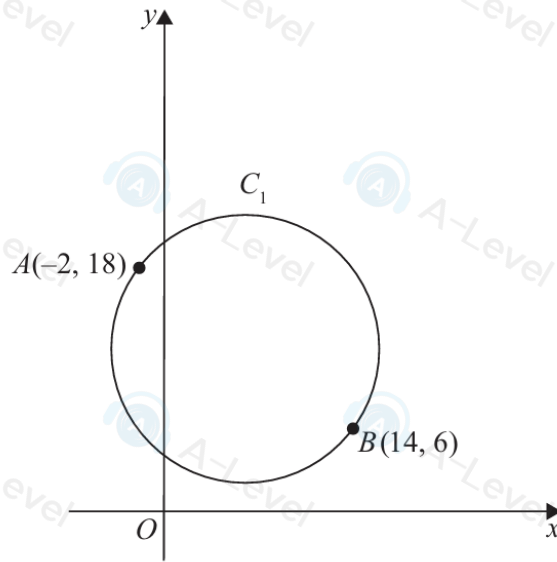


Figure 2

The points $A(-2, 18)$ and $B(14, 6)$ lie on a circle C_1 as shown in Figure 2.

Given that AB is a diameter of the circle C_1

(a) find an equation for C_1 making your method clear.

(5)

A circle C_2 has its centre at the origin.

Given that circles C_1 and C_2 touch,

(b) find possible equations for C_2

(4)

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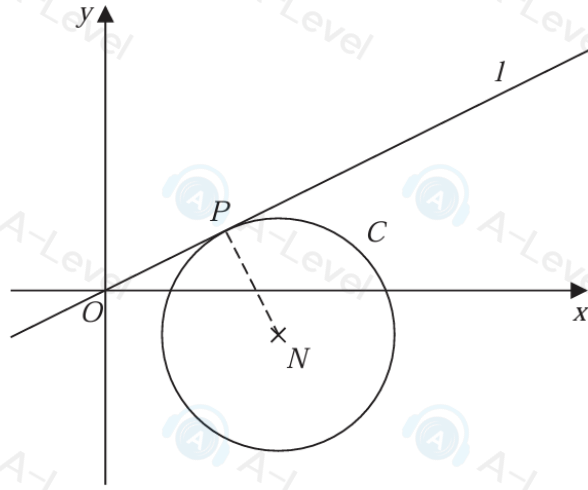


Figure 1

Figure 1 shows a sketch of a circle C with centre $N(4, -1)$.

The line l with equation $y = \frac{1}{2}x$ is a tangent to C at the point P .

Find

(a) the equation of line PN in the form $y = mx + c$, where m and c are constants, (2)

(b) the equation of C . (5)

2. A circle C has equation

$$x^2 + y^2 + 4x - 10y - 21 = 0$$

Find

(a) (i) the coordinates of the centre of C ,
 (ii) the exact value of the radius of C . (3)

The point $P(5, 4)$ lies on C .

(b) Find the equation of the tangent to C at P , writing your answer in the form $y = mx + c$, where m and c are constants to be found. (4)

2: The line joining the points $(-2, 5)$ and $(4, 15)$ is the diameter of a circle C .

(a) Find an equation for C . (5)

(b) Hence find the exact coordinates of the point on C that is nearest the x -axis. (2)

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6. A circle C has equation $x^2 + y^2 - 6x - 14y + k = 0$ where k is constant.

(a) Find the coordinates of the centre of C .

(2)

(b) Find the radius of C when $k = -32$

(2)

(c) Find the range of values of k for which C lies completely within the first quadrant.

(4)

(Total for Question 6 is 8 marks)

3. A circle C has centre $(2, 5)$

Given that the point $P(8, -3)$ lies on C

(a) (i) find the radius of C

(ii) find an equation for C

(3)

(b) Find the 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 to be found.

(4)

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7. The circle C_1 has equation

$$x^2 + y^2 + 8x - 10y = 29$$

(a) (i) Find the coordinates of the centre of C_1

(ii) Find the exact value of the radius of C_1

(3)

In part (b) you must show detailed reasoning.

The circle C_2 has equation

$$(x - 5)^2 + (y + 8)^2 = 52$$

(b) Prove that the circles C_1 and C_2 neither touch nor intersect.

(3)