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**Circles - Edexcel Past Exam Questions**

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1. The circle  $C$ , with centre at the point  $A$ , has equation  $x^2 + y^2 - 10x + 9 = 0$ .

Find

- (a) the coordinates of  $A$ , (2)
- (b) the radius of  $C$ , (2)
- (c) the coordinates of the points at which  $C$  crosses the  $x$ -axis. (2)

Given that the line  $l$  with gradient  $\frac{7}{2}$  is a tangent to  $C$ , and that  $l$  touches  $C$  at the point  $T$ ,

- (d) find an equation of the line which passes through  $A$  and  $T$ . (3)

**June 05 Q8**

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2. The points  $A$  and  $B$  have coordinates  $(5, -1)$  and  $(13, 11)$  respectively.

- (a) Find the coordinates of the mid-point of  $AB$ . (2)

Given that  $AB$  is a diameter of the circle  $C$ ,

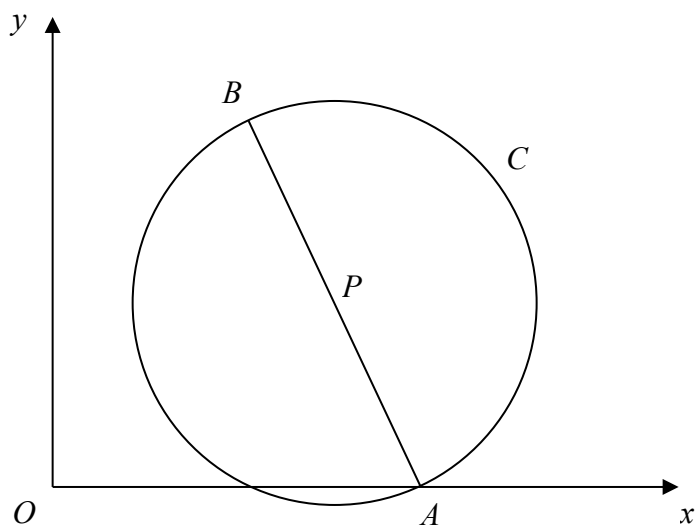
- (b) find an equation for  $C$ . (4)

**Jan 05 Q2**

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3.

Figure 1



In Figure 1,  $A(4, 0)$  and  $B(3, 5)$  are the end points of a diameter of the circle  $C$ .

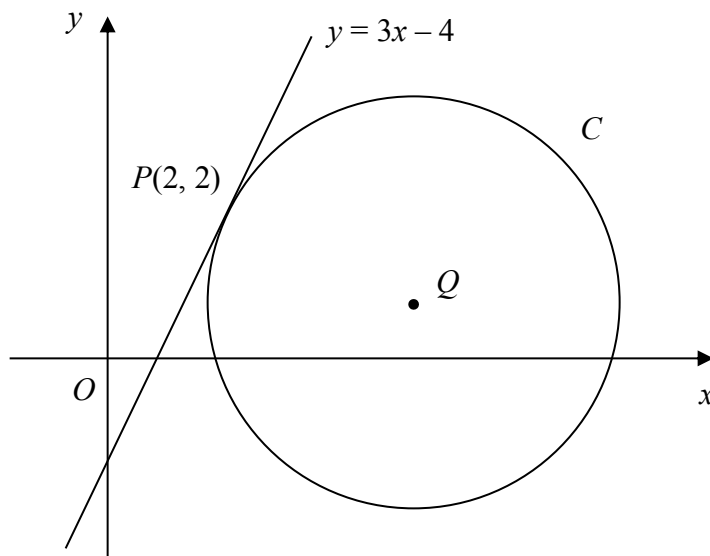
Find

- (a) the exact length of  $AB$ , (2)
- (b) the coordinates of the midpoint  $P$  of  $AB$ , (2)
- (c) an equation for the circle  $C$ . (3)

**Jan 06 Q3**

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4.

**Figure 1**


The line  $y = 3x - 4$  is a tangent to the circle  $C$ , touching  $C$  at the point  $P(2, 2)$ , as shown in Figure 1.

The point  $Q$  is the centre of  $C$ .

(a) Find an equation of the straight line through  $P$  and  $Q$ . (3)

Given that  $Q$  lies on the line  $y = 1$ ,

(b) show that the  $x$ -coordinate of  $Q$  is 5, (1)

(c) find an equation for  $C$ . (4)

**June 06 Q7**

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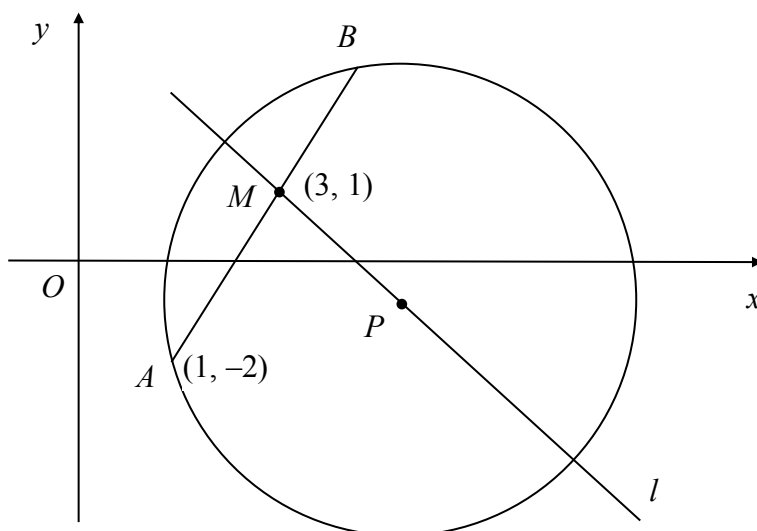
5. The line joining points  $(-1, 4)$  and  $(3, 6)$  is a diameter of the circle  $C$ .

Find an equation for  $C$ . (6)

**Jan 07 Q3**

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6.


**Figure 3**

The points  $A$  and  $B$  lie on a circle with centre  $P$ , as shown in Figure 3. The point  $A$  has coordinates  $(1, -2)$  and the mid-point  $M$  of  $AB$  has coordinates  $(3, 1)$ . The line  $l$  passes through the points  $M$  and  $P$ .

(a) Find an equation for  $l$ . (4)

Given that the  $x$ -coordinate of  $P$  is 6,

(b) use your answer to part (a) to show that the  $y$ -coordinate of  $P$  is  $-1$ , (1)

(c) find an equation for the circle. (4)

**June 07 Q7**

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7. The circle  $C$  has centre  $(3, 1)$  and passes through the point  $P(8, 3)$ .

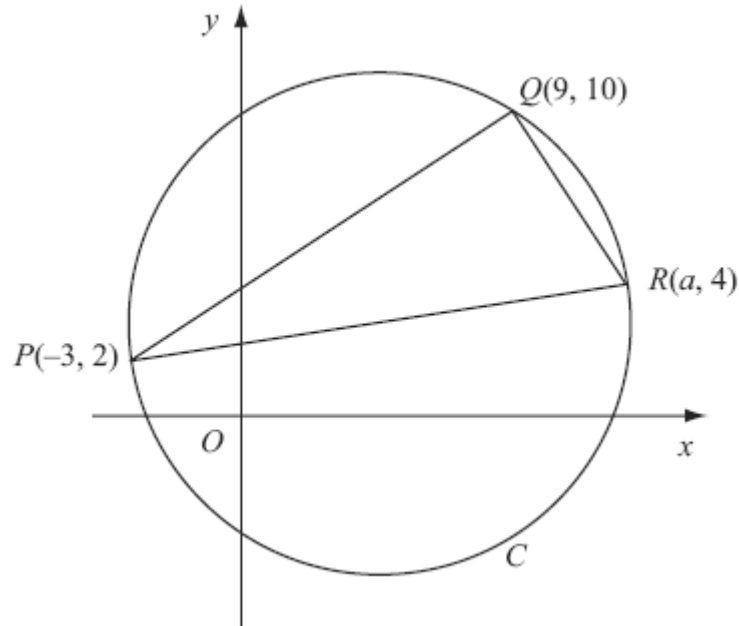
(a) Find an equation for  $C$ . (4)

(b) Find an equation for the tangent to  $C$  at  $P$ , giving your answer in the form  $ax + by + c = 0$ , where  $a$ ,  $b$  and  $c$  are integers. (5)

**June 08 Q5**

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8.



The points  $P(-3, 2)$ ,  $Q(9, 10)$  and  $R(a, 4)$  lie on the circle  $C$ , as shown in Figure 2.

Given that  $PR$  is a diameter of  $C$ ,

(a) show that  $a = 13$ , (3)

(b) find an equation for  $C$ . (5)

**Jan 09 Q5**

9. The circle  $C$  has equation

$$x^2 + y^2 - 6x + 4y = 12$$

(a) Find the centre and the radius of  $C$ . (5)

The point  $P(-1, 1)$  and the point  $Q(7, -5)$  both lie on  $C$ .

(b) Show that  $PQ$  is a diameter of  $C$ . (2)

The point  $R$  lies on the positive  $y$ -axis and the angle  $PRQ = 90^\circ$ .

(c) Find the coordinates of  $R$ . (4)

**June 09 Q6**

10.

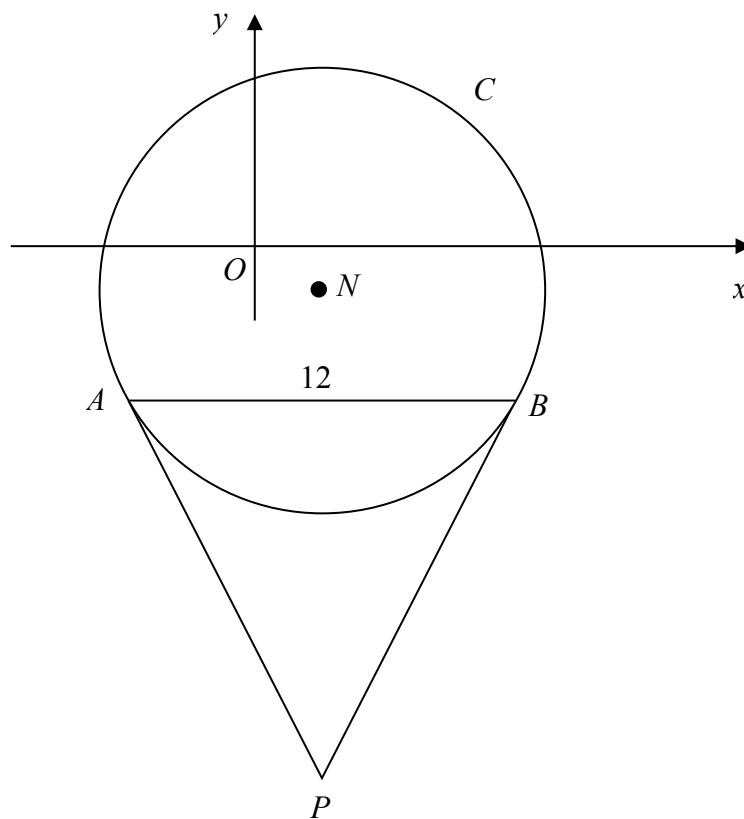

**Figure 3**

Figure 3 shows a sketch of the circle  $C$  with centre  $N$  and equation

$$(x - 2)^2 + (y + 1)^2 = \frac{169}{4}.$$

(a) Write down the coordinates of  $N$ . (2)

(b) Find the radius of  $C$ . (1)

The chord  $AB$  of  $C$  is parallel to the  $x$ -axis, lies below the  $x$ -axis and is of length 12 units as shown in Figure 3.

(c) Find the coordinates of  $A$  and the coordinates of  $B$ . (5)

(d) Show that angle  $ANB = 134.8^\circ$ , to the nearest 0.1 of a degree. (2)

The tangents to  $C$  at the points  $A$  and  $B$  meet at the point  $P$ .

(e) Find the length  $AP$ , giving your answer to 3 significant figures (2)

**Jan 10 Q8**

11. The circle  $C$  has centre  $A(2,1)$  and passes through the point  $B(10, 7)$  .

(a) Find an equation for  $C$ . (4)

The line  $l_1$  is the tangent to  $C$  at the point  $B$ .

(b) Find an equation for  $l_1$ . (4)

The line  $l_2$  is parallel to  $l_1$  and passes through the mid-point of  $AB$ .

Given that  $l_2$  intersects  $C$  at the points  $P$  and  $Q$ ,

(c) find the length of  $PQ$ , giving your answer in its simplest surd form. (3)

**June 10 Q10**

12. The points  $A$  and  $B$  have coordinates  $(-2, 11)$  and  $(8, 1)$  respectively.

Given that  $AB$  is a diameter of the circle  $C$ ,

(a) show that the centre of  $C$  has coordinates  $(3, 6)$ , (1)

(b) find an equation for  $C$ . (4)

(c) Verify that the point  $(10, 7)$  lies on  $C$ . (1)

(d) Find an equation of the tangent to  $C$  at the point  $(10, 7)$ , giving your answer in the form  $y = mx + c$ , where  $m$  and  $c$  are constants. (4)

**Jan 11 Q9**

13. The circle  $C$  has equation

$$x^2 + y^2 + 4x - 2y - 11 = 0.$$

Find

(a) the coordinates of the centre of  $C$ , (2)

(b) the radius of  $C$ , (2)

(c) the coordinates of the points where  $C$  crosses the  $y$ -axis, giving your answers as simplified surds. (4)

**June 11 Q4**