Surname	
Other Names	
Candidate Signature	

Centre Number						Candidate Number				

Examiner Comments	

Total Marks

MATHEMATICS

AS LEVEL QUESTION COMPILATION

CM

Questions on: Coordinate Geometry of a Circle

Instructions to candidates:

• In the boxes above, write your centre number, candidate number, your surname, other names and signature.

• Answer ALL of the questions.

• You must write your answer for each question in the spaces provided.

• You may use a calculator.

Information to candidates:

• Full marks may only be obtained for answers to ALL of the questions.

• The marks for individual questions and parts of the questions are shown in round brackets.

• There are 6 questions in this question paper. The total mark for this paper is 43.

Advice to candidates:

• You should ensure your answers to parts of the question are clearly labelled.

• You should show sufficient working to make your workings clear to the Examiner.

• Answers without working may not gain full credit.

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1 5 3 3 2 2 2 1 8 0 0 0 4

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1 The circle C has the equation $x^2 + 2x + y^2 + 5y = 6$.

(a) Express the equation of C in the form , giving your answer in the form

$$(x - a)^2 + (y - b)^2 = k$$

where a, b and k are integers to be found. **(4)**

(b) Hence, write down

(i) the centre of C,

(ii) the radius of C. **(2)**

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Question 1 continued

TOTAL 6 MARKS

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2 The points A and B have coordinates $(-2, 4)$ and $(3, 6)$ respectively.

The line segment AB is a diameter of the circle C.

(a) Find the equation of C, giving your answer in the form

$$(x - a)^2 + (y - b)^2 = k$$

where a, b and k are integers to be found. **(4)**

(b) Determine whether the origin O lies inside or outside of the circle C. **(2)**

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Question 2 continued

TOTAL 6 MARKS

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3 The circle C is centered at the point $P(2, 5)$.

The line l is a tangent to C at the point $Q(4, 1)$.

(a) Determine the equation of the circle C, giving your answer in the form

$$(x - a)^2 + (y - b)^2 = k$$

where a, b and k are integers to be found. **(3)**

(b) Find the equation of the line l, giving your answer in the form $y = mx + c$. **(3)**

The normal to C at the point Q intersects C a second time at the point R.

(c) Write down the distance QR. **(1)**

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Question 3 continued

TOTAL 5 MARKS

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4

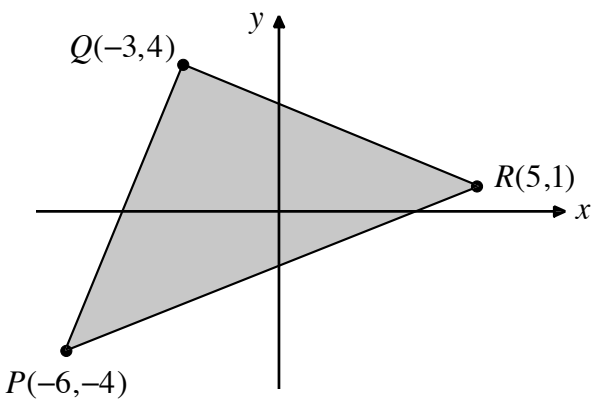

Figure 1

Figure 1 above shows the points $P(-6, -4)$, $Q(-3, 4)$ and $R(5, 1)$.

(a) Show that the triangle PQR is right-angled. **(3)**

(b) Hence, find the equation of the circumcircle of the triangle PQR. **(3)**

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Question 4 continued

TOTAL 6 MARKS

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5

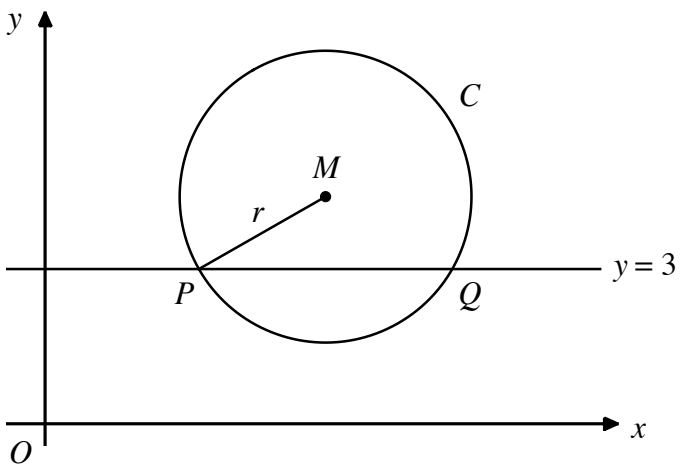

Figure 2

Figure 2 above shows a sketch of the circle C with equation

$$x^2 + y^2 - 10x - 8y + 37 = 0$$

The circle C has centre M and radius r.

(a) Find (i) the coordinates of M,

(ii) the value of r. **(4)**

The line with equation $y = 3$ intersects C at the points P and Q.

(b) Find the coordinates of P and Q. **(3)**

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Question 5 continued

TOTAL 10 MARKS

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6

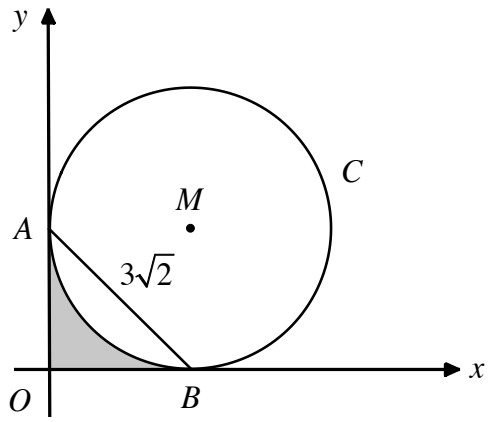

Figure 3

Figure 3 above shows a sketch of the circle C, which touches the x axis at the point A and touches the y axis at the point B. The point M is the centre of C.

Given that the chord AB has length $3\sqrt{2}$,

(a) find the coordinates of A and B. **(3)**

(b) Hence, write down the equation of C, giving your answer in the form

$$(x - a)^2 + (y - b)^2 = k$$

where a, b and k are integers to be found. **(3)**

The region shown shaded in Figure 3 is bounded by the coordinate axes and the circle C.

(c) Showing your working clearly, calculate the area of the shaded region. **(4)**

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Question 6 continued

TOTAL 10 MARKS