Write your name here

Surname	Other names

Pearson Edexcel GCE

Centre Number	Candidate Number

AS and A level Mathematics

Practice Paper
Pure Mathematics - Coordinate geometry

You must have:
Mathematical Formulae and Statistical Tables (Pink)

Total Marks

Instructions

- Use black ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all the questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided – there may be more space than you need.
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 12 questions in this question paper. The total mark for this paper is 100.
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.
- Calculators must not be used for questions marked with a * sign.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

1*. The points P and Q have coordinates $(-1, 6)$ and $(9, 0)$ respectively.

The line l is perpendicular to PQ and passes through the mid-point of PQ.

Find an equation for l, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(Total 5 marks)

2*.

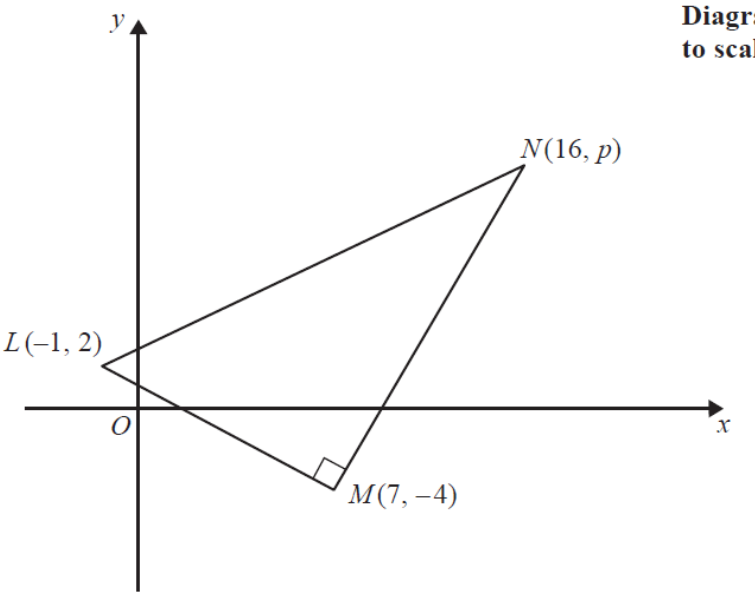


Figure 1

Figure 1 shows a right angled triangle LMN.

The points L and M have coordinates $(-1, 2)$ and $(7, -4)$ respectively.

(a) Find an equation for the straight line passing through the points L and M.

Give your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(4)

Given that the coordinates of point N are $(16, p)$, where p is a constant, and angle $LMN = 90°$,

(b) find the value of p.

(3)

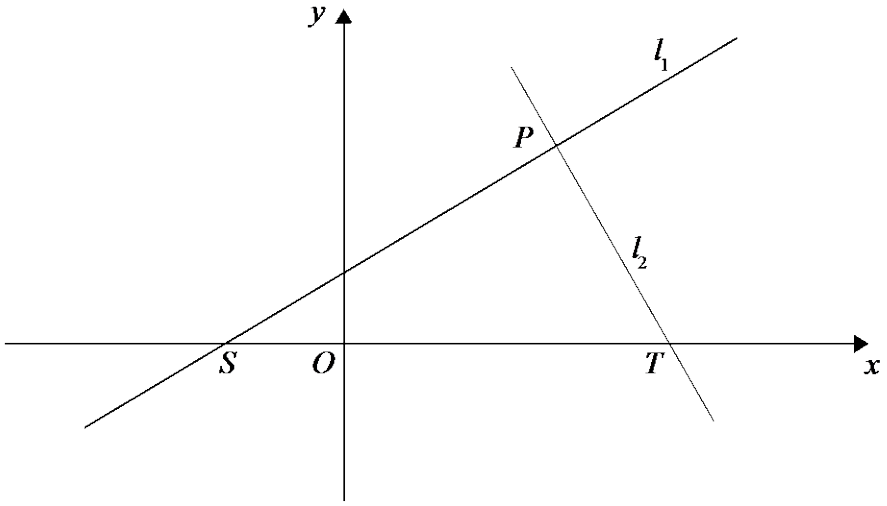
Given that there is a point K such that the points L, M, N, and K form a rectangle,

(c) find the y coordinate of K.

(2)

(Total 9 marks)

3*.



Not to scale

Figure 1

The straight line l_1 , shown in Figure 1, has equation $5y = 4x + 10$

The point P with x coordinate 5 lies on l_1

The straight line l_2 is perpendicular to l_1 and passes through P.

(a) Find an equation for l_2 , writing your answer in the form $ax + by + c = 0$ where a, b and c are integers.

(4)

The lines l_1 and l_2 cut the x-axis at the points S and T respectively, as shown in Figure 1.

(b) Calculate the area of triangle SPT.

(4)

(Total 8 marks)

4*.

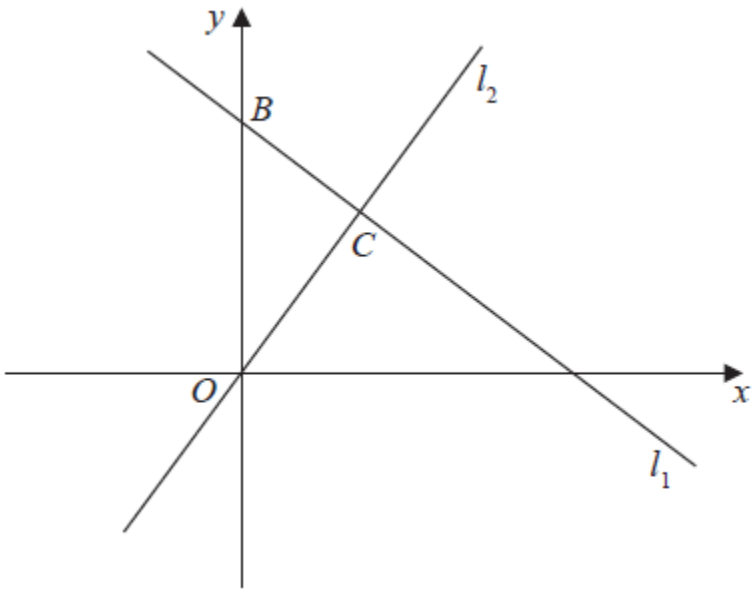


Figure 2

The line l_1, shown in Figure 2 has equation $2x + 3y = 26$.

The line l_2 passes through the origin O and is perpendicular to l_1.

(a) Find an equation for the line l_2.

(4)

The line l_2 intersects the line l_1 at the point C. Line l_1 crosses the y-axis at the point B as shown in Figure 2.

(b) Find the area of triangle OBC. Give your answer in the form $\frac{a}{b}$, where a and b are integers to be determined.

(6)

(Total 10 marks)

5*. The line L_1 has equation $4y + 3 = 2x$.

The point A $(p, 4)$ lies on L_1.

(a) Find the value of the constant p.

(1)

The line L_2 passes through the point C $(2, 4)$ and is perpendicular to L_1.

(b) Find an equation for L_2 giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(5)

The line L_1 and the line L_2 intersect at the point D.

(c) Find the coordinates of the point D.

(3)

(d) Show that the length of CD is $\frac{3}{2}\sqrt{5}$.

(3)

A point B lies on L_1 and the length of $AB = \sqrt{80}$.

The point E lies on L_2 such that the length of the line CDE = 3 times the length of CD.

(e) Find the area of the quadrilateral $ACBE$.

(3)

(Total 15 marks)

6*.

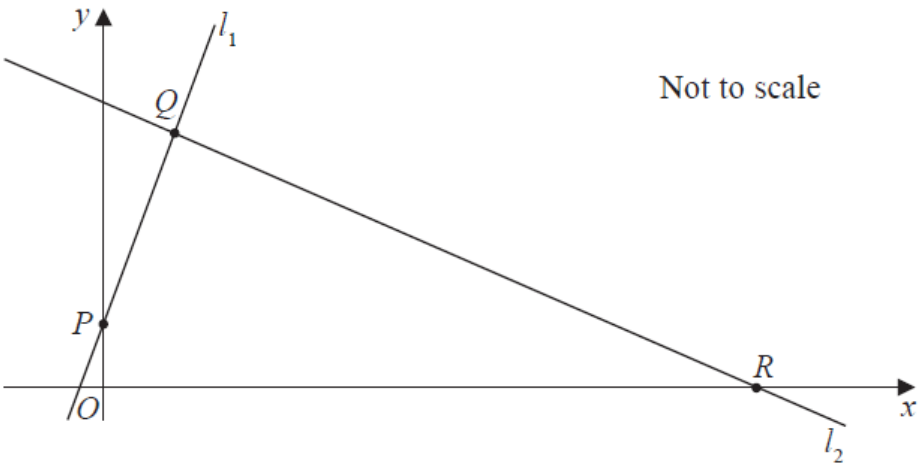


Figure 3

The points P (0, 2) and Q (3, 7) lie on the line l_1, as shown in Figure 3.

The line l_2 is perpendicular to l_1, passes through Q and crosses the x-axis at the point R, as shown in Figure 3.

Find

(a) an equation for l_2, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers,

(5)

(b) the exact coordinates of R,

(2)

(c) the exact area of the quadrilateral $ORQP$, where O is the origin.

(5)

(Total 12 marks)

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7. A circle C has centre $(-1, 7)$ and passes through the point $(0, 0)$. Find an equation for C.

(Total 4 marks)

8.

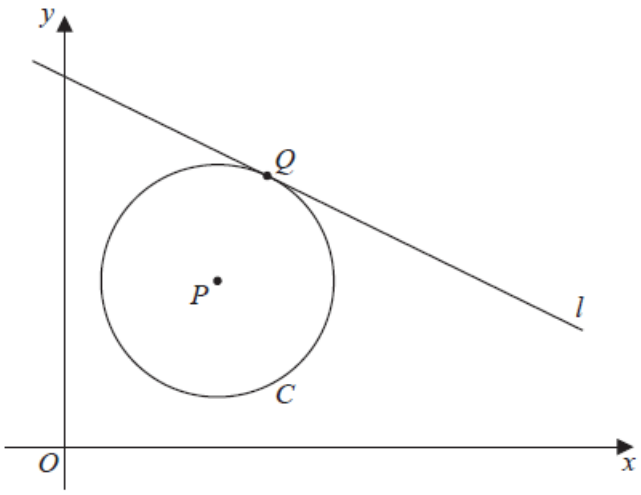

Diagram not drawn to scale

Figure 4

The circle C has centre $P(7, 8)$ and passes through the point $Q(10, 13)$, as shown in Figure 4.

(a) Find the length PQ, giving your answer as an exact value.

(2)

(b) Hence write down an equation for C.

(2)

The line l is a tangent to C at the point Q, as shown in Figure 4.

(c) Find an equation for l, giving your answer in the form $ax + by + c = 0$, where a, b and c are integers.

(4)

(Total 8 marks)

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9. 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)

(Total 8 marks)

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10. The circle C has equation

$$x^2 + y^2 - 10x + 6y + 30 = 0$$

Find

(a) the coordinates of the centre of C,

(2)

(b) the radius of C,

(2)

(c) the y coordinates of the points where the circle C crosses the line with equation $x = 4$, giving your answers as simplified surds.

(3)

(Total 7 marks)

11.

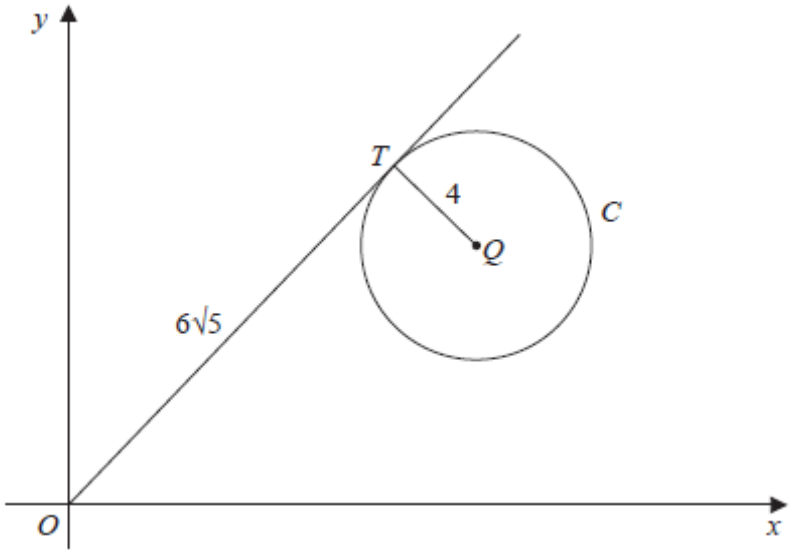

Figure 5

Figure 5 shows a circle C with centre Q and radius 4 and the point T which lies on C. The tangent to C at the point T passes through the origin O and $OT = 6\sqrt{5}$.

Given that the coordinates of Q are $(11, k)$, where k is a positive constant,

(a) find the exact value of k,

(3)

(b) find an equation for C.

(2)

(Total 5 marks)

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12. The circle C, with centre A, passes through the point P with coordinates $(-9, 8)$ and the point Q with coordinates $(15, -10)$.

Given that PQ is a diameter of the circle C,

(a) find the coordinates of A,

(2)

(b) find an equation for C.

(3)

A point R also lies on the circle C.

Given that the length of the chord PR is 20 units,

(c) find the length of the shortest distance from A to the chord PR.

Give your answer as a surd in its simplest form.

(2)

(d) Find the size of the angle ARQ, giving your answer to the nearest 0.1 of a degree.

(2)

(Total 9 marks)

TOTAL FOR PAPER: 100 MARKS