Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Straight-line graphs

Time allowed: 2 hours 10 minutes

Subject code **0606**

Additional Mathematics

Questions from Paper 1 and Paper 2

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
Questions 1-2, 4, 8, 10 (Paper 1): no calculator.
Questions 3, 5-7, 9 (Paper 2): calculator allowed.

Total marks

/ 84

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 84 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

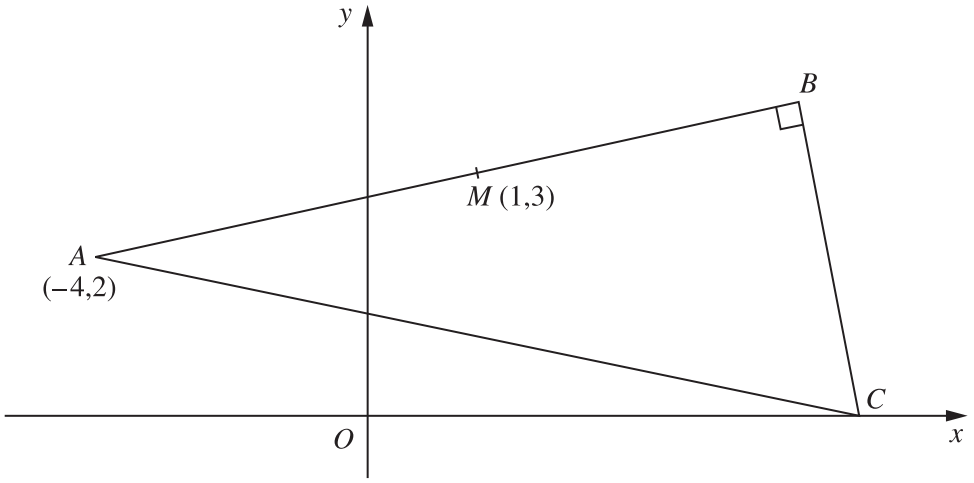
Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1



The figure shows a right-angled triangle ABC, where the point A has coordinates $(-4,2)$, the angle B is 90° and the point C lies on the x-axis. The point $M(1,3)$ is the midpoint of AB. Find the area of the triangle ABC. [7]

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Coordinate geometry of straight lines Click for more variations

2 It is known that $y = A \times 10^{bx^2}$, where A and b are constants. When $\lg y$ is plotted against x^2, a straight line passing through the points (3.63, 5.25) and (4.83, 6.88) is obtained.

(a) Find the value of A and of b. [4]

Using your values of A and b, find

(b) the value of y when $x = 2$, [2]

(c) the positive value of x when $y = 4$. [2]

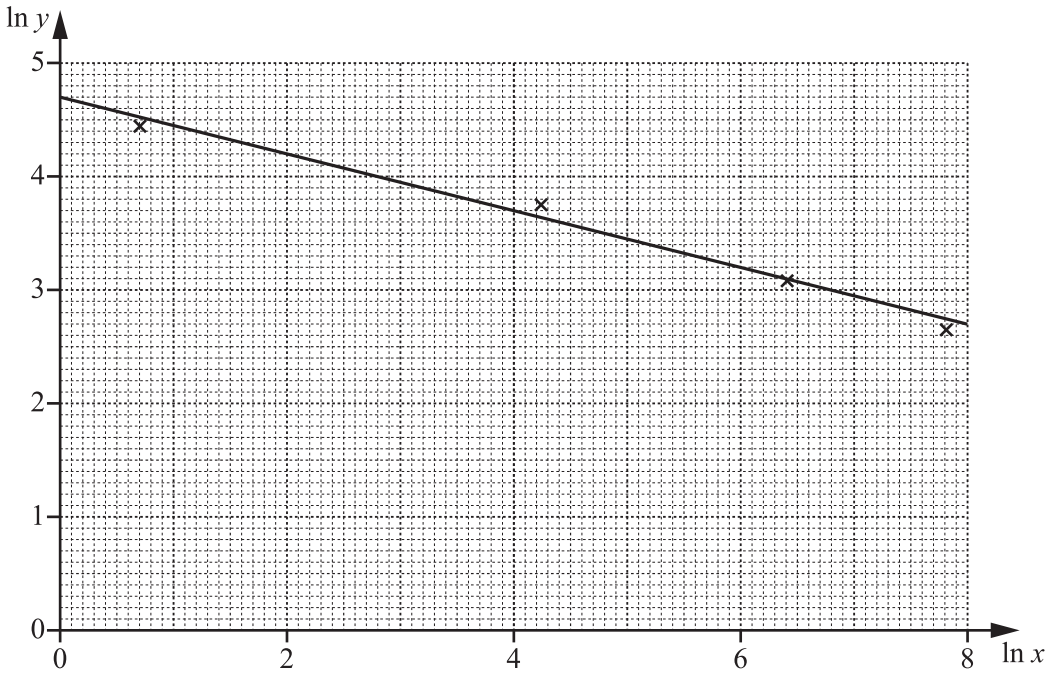
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Linear law (straight-line form) Click for more variations

3 An experiment was carried out recording values of y for certain values of x. The variables x and y are thought to be connected by the relationship $y = ax^n$, where a and n are constants.

(i) Transform the relationship $y = ax^n$ into straight line form. [2]

The values of $\ln y$ and $\ln x$ were plotted and a line of best fit drawn. This is shown in the diagram below.



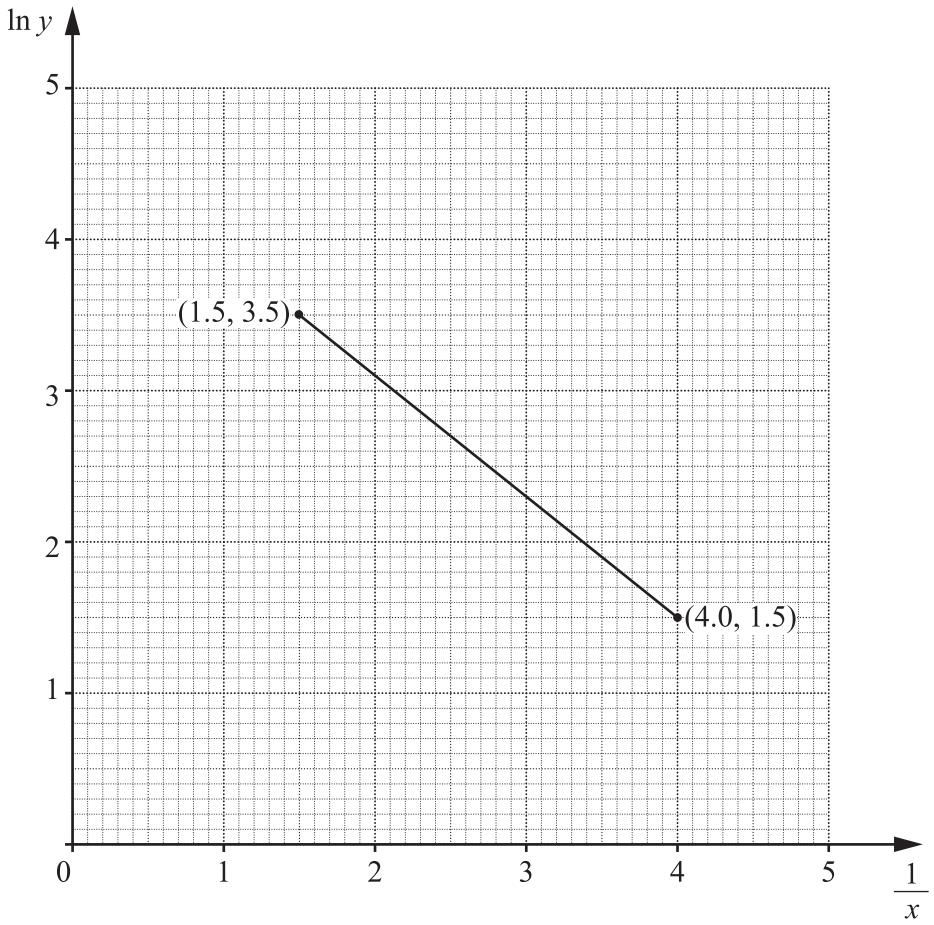
(ii) Use the graph to find the value of a and of n, stating the coordinates of the points that you use. [3]

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(iii) Find the value of x when $y = 50$. [2]

Linear law (straight-line form) Click for more variations

4



The variables x and y are such that when $\ln y$ is plotted against $\frac{1}{x}$ the straight line graph shown above is obtained.

(i) Given that $y = Ae^{\frac{b}{x}}$, find the value of A and of b. [4]

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(ii) Find the value of y when $x = 0.32$. [2]

(iii) Find the value of x when $y = 20$. [2]

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Linear law (straight-line form) Click for more variations

5 Solutions to this question by accurate drawing will not be accepted.

The points A and B have coordinates $(p, 3)$ and $(1, 4)$ respectively and the line L has equation $3x + y = 2$.

(i) Given that the gradient of AB is $\frac{1}{3}$, find the value of p. [2]

(ii) Show that L is the perpendicular bisector of AB. [3]

(iii) Given that $C(q, -10)$ lies on L, find the value of q. [1]

(iv) Find the area of triangle ABC. [2]

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Coordinate geometry of straight lines Click for more variations

6 Points A and B have coordinates $(-2, 10)$ and $(4, 2)$ respectively. C is the mid-point of the line AB.

Point D is such that $\overrightarrow{CD} = \begin{pmatrix} 12 \\ 9 \end{pmatrix}$.

(i) Find the coordinates of C and of D. [3]

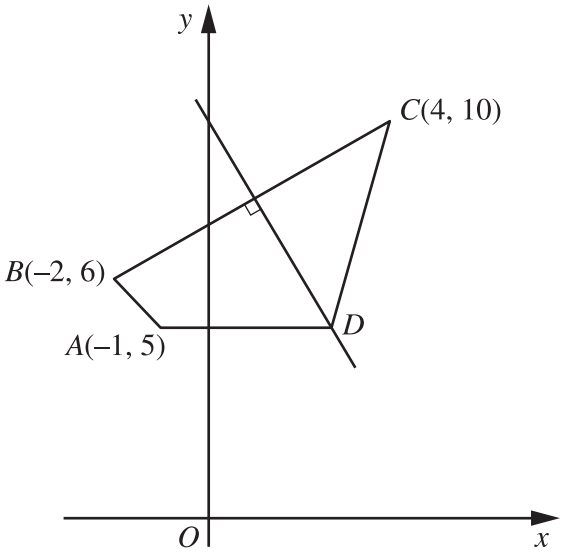
(ii) Show that CD is perpendicular to AB. [3]

(iii) Find the area of triangle ABD. [2]

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Vectors: position, magnitude and geometry Click for more variations

7 Solutions to this question by accurate drawing will not be accepted.



In the diagram the points $A(-1, 5)$, $B(-2, 6)$, $C(4, 10)$ and D are the vertices of a quadrilateral in which AD is parallel to the x-axis. The perpendicular bisector of BC passes through D. Find the area of the quadrilateral $ABCD$. [8]

Coordinate geometry of straight lines Click for more variations

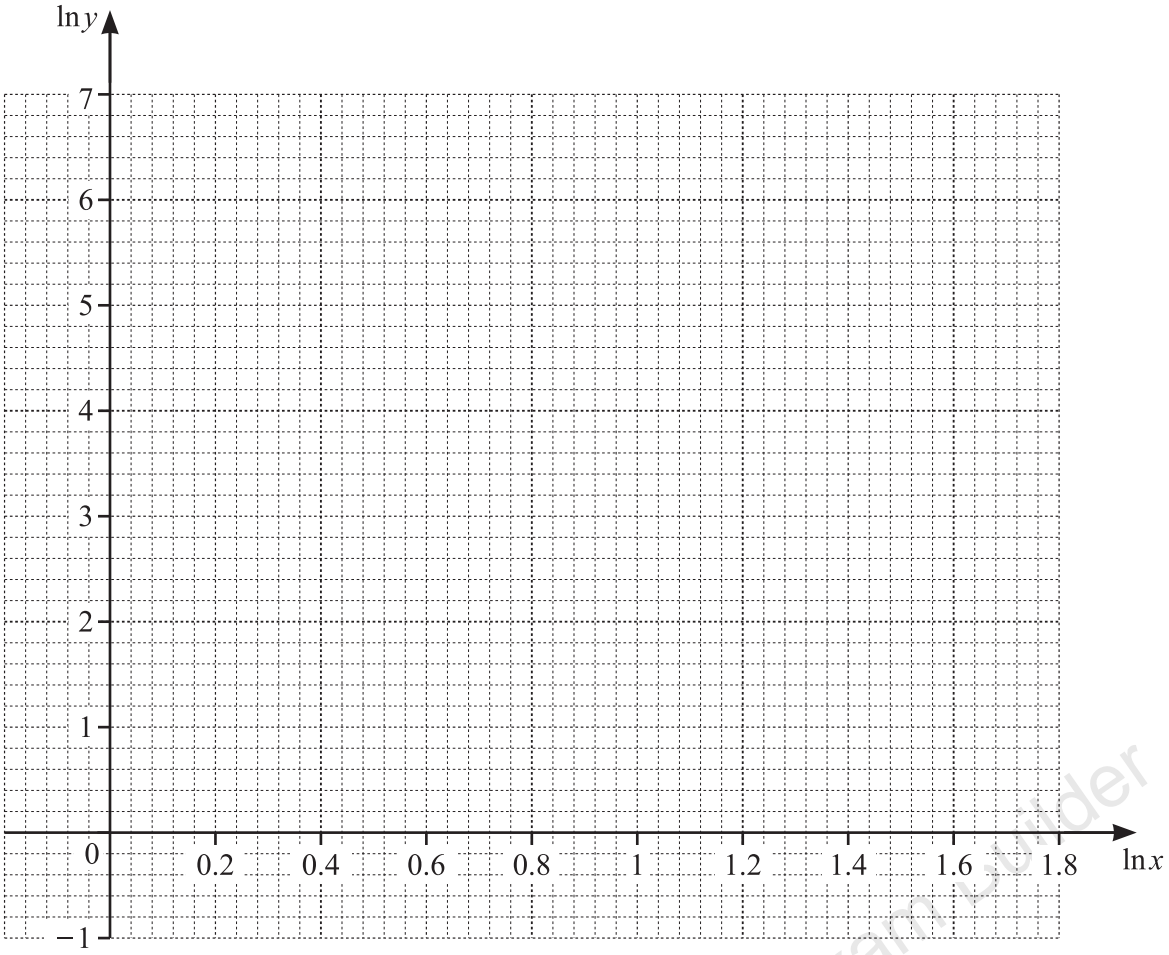
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8

x	1	2	3	4	5
y	20	57	104	160	224

The table shows values of the variables x and y, which are related by the equation $y = Ax^b$, where A and b are constants.

(a) Use the data to draw a straight line graph of $\ln y$ against $\ln x$. [3]



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(b) Use your graph to estimate the values of A and b. Give your answers correct to 2 significant figures. [4]

(c) Use your graph to estimate the value of y when $x = 3.5$. [2]

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Linear law (straight-line form) Click for more variations

9 The table shows experimental values of two variables x and y.

x	1	2	3	4
y	9.41	1.29	−0.69	−1.77

It is known that x and y are related by the equation $y = \frac{a}{x^2} + bx$, where a and b are constants.

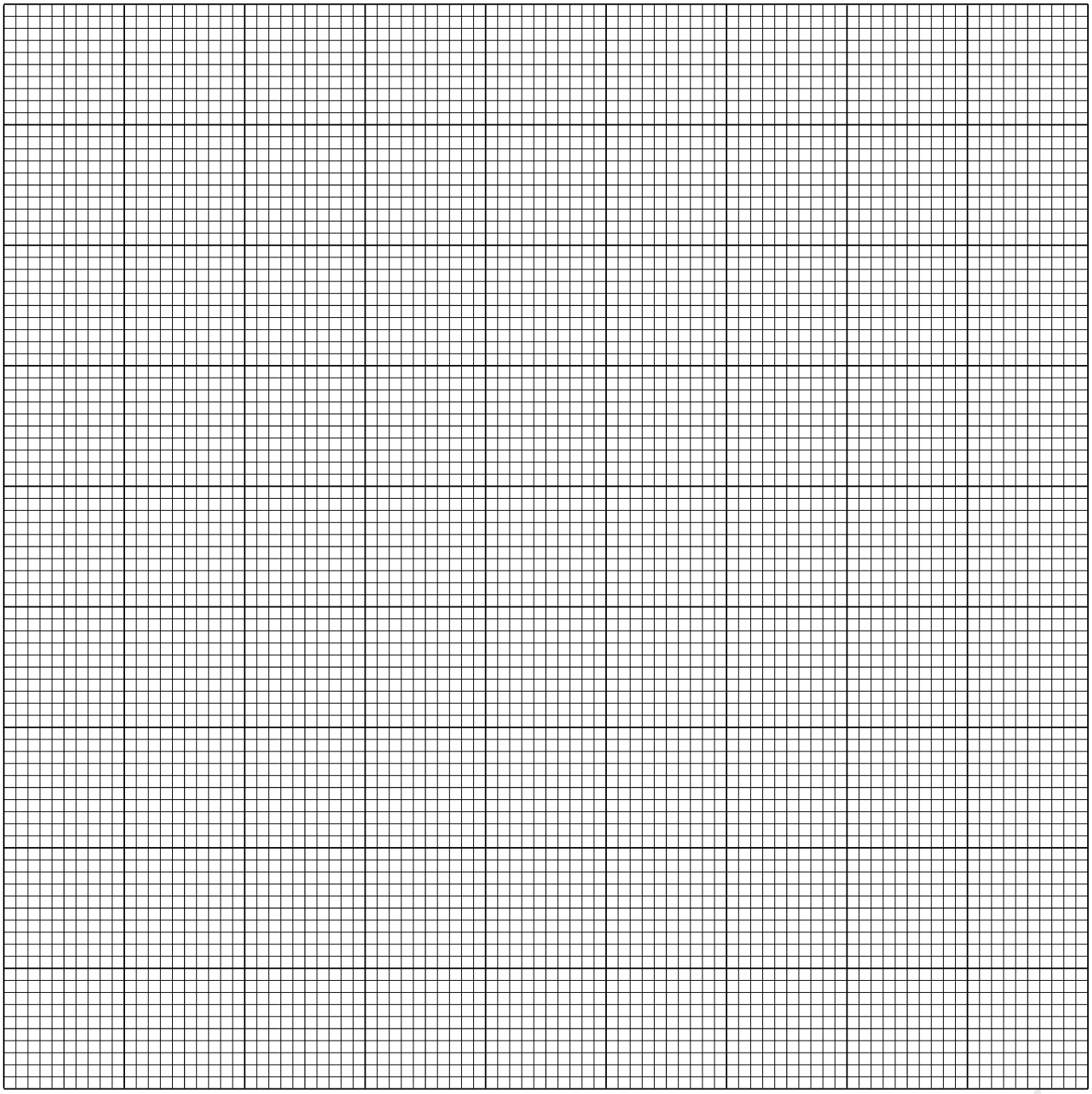
(i) A straight line graph is to be drawn to represent this information. Given that x^2y is plotted on the vertical axis, state the variable to be plotted on the horizontal axis. [1]

(ii) On the grid opposite, draw this straight line graph. [3]

(iii) Use your graph to estimate the value of a and of b. [3]

(iv) Estimate the value of y when x is 3.7. [2]

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Linear law (straight-line form) Click for more variations

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10 The straight line $y = 2x + 1$ intersects the curve $y + xy + 3x^2 = 15$ at the points A and B. The point C with coordinates $\left(\frac{21}{10}, k\right)$ lies on the perpendicular bisector of AB.

(a) Find the exact value of k. [8]

(b) The point D lies on the perpendicular bisector of AB such that its perpendicular distance from AB is twice that of the point C from AB. Find the possible coordinates of D. [4]

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Coordinate geometry of straight lines Click for more variations