

Candidate Name	Centre Number	Candidate Number
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GCSE

185/04

MATHEMATICS (2 Tier)

HIGHER TIER

PAPER 1

A.M. MONDAY, 19 May 2008

2 hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	2	
2	5	
3	2	
4	4	
5	7	
6	10	
7	6	
8	3	
9	3	
10	4	
11	4	
12	4	
13	4	
14	1	
15	3	
16	4	
17	4	
18	4	
19	3	
20	4	
21	4	
22	5	
23	3	
24	3	
25	4	
TOTAL MARK		

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

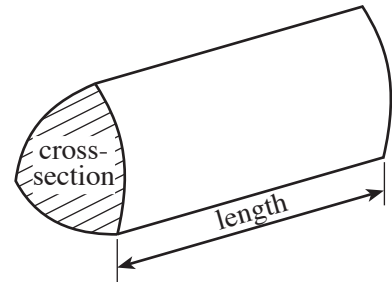
Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

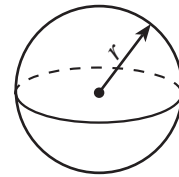
Formula List

Volume of prism = area of cross-section \times length



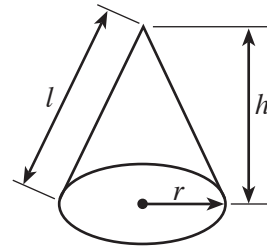
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$

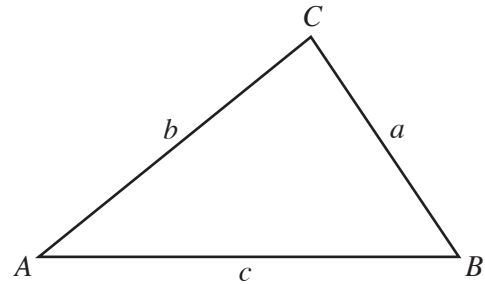


In any triangle ABC

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Standard Deviation

Standard deviation for a set of numbers

x_1, x_2, \dots, x_n , having a mean of \bar{x} is given by

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n}} \quad \text{or} \quad s = \sqrt{\frac{\sum x^2}{n} - \left\{ \frac{\sum x}{n} \right\}^2}$$

1. Clearly showing how you obtained your answer, ESTIMATE the value of:

$$\frac{87 \times 248}{52}$$

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[2]

2. (a) Find 240 as a percentage of 600.

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[2]

- (b) A recipe for making 12 pancakes includes the following ingredients.

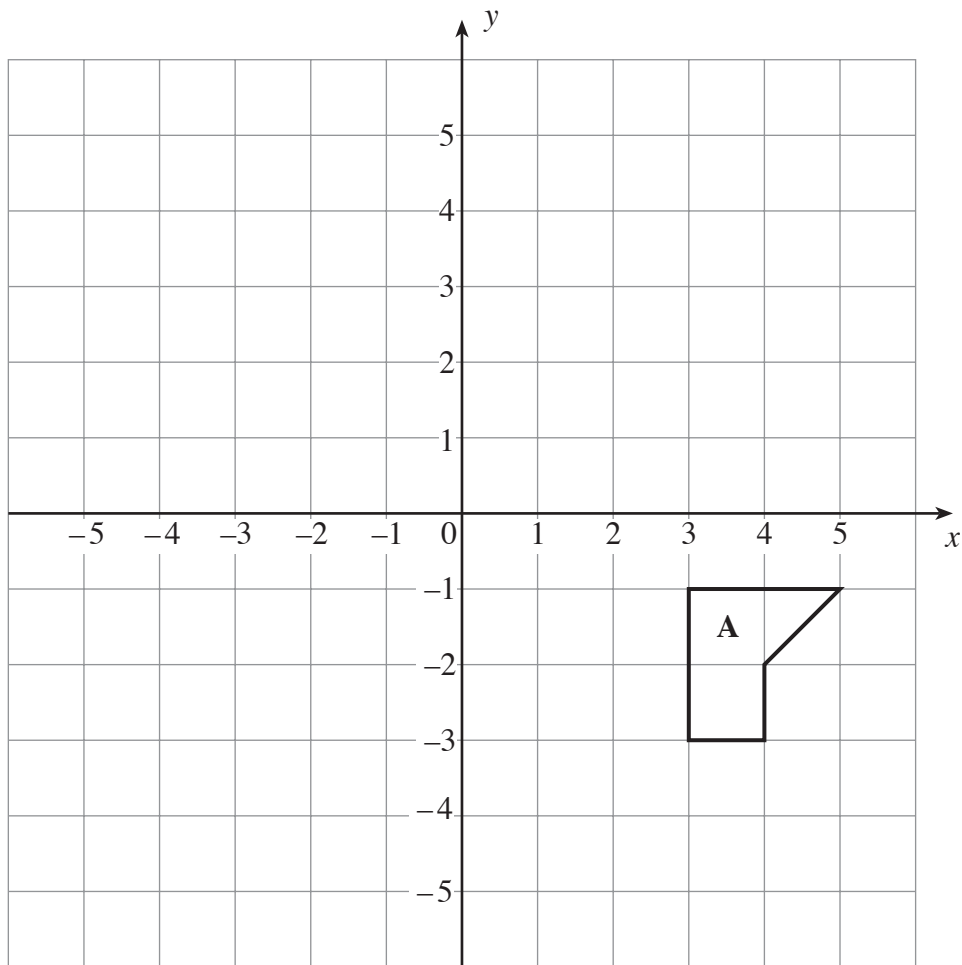
2 large eggs
200ml milk
110g flour

Calculate the quantities of these ingredients needed to make 30 pancakes.

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[3]

3. Reflect the shape marked **A** in the line $x = 1$.



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[2]

4. In a game a player rolls a coin onto a squared board. The squares on the board are coloured red, blue, green or yellow. If the coin lands entirely within one of these coloured squares the player wins a prize, otherwise the player loses.

The table below shows the probabilities of the coin landing entirely within the coloured squares.

Colour	Red	Blue	Green	Yellow	Player loses
Probability	0.15	0.09	0.05	0.06	0.65

- (a) One day 200 people play this game. Approximately how many would you expect to win a prize?

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[2]

- (b) It costs 80p to play the game once. The prize for winning is £2. If the 200 people play the game once, approximately how much profit do you expect the game to make?

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[2]

5. (a) The angles of a quadrilateral are x° , 49° , $3x^\circ$ and 111° .
Form an equation in x , and use your equation to find the value of x .

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[4]

- (b) Find the size of **each** of the angles marked x and y in the following diagram.

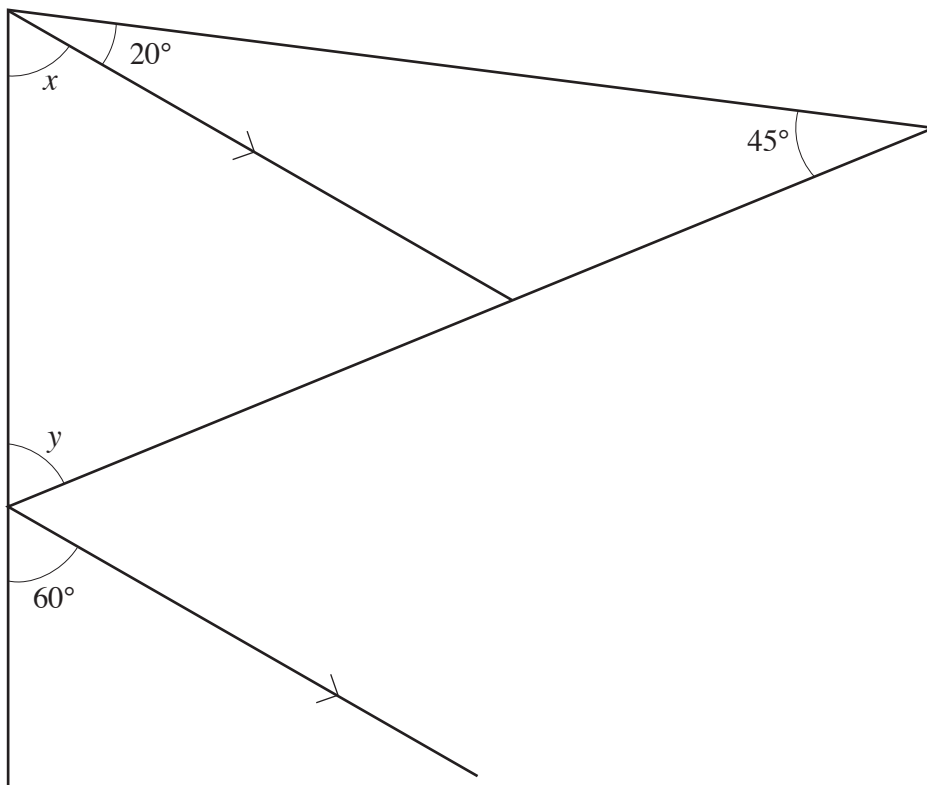


Diagram not drawn to scale.

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$$x = \dots\dots\dots^\circ \quad y = \dots\dots\dots^\circ$$

[3]

6. (a) Solve **each** of the following equations.

(i) $7x + 4 = 3x + 16$

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(ii) $3x + 2 = 2(3 - 2x)$

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[6]

(b) Simplify **each** of the following.

(i) $2(3r + 1) + 5r$

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(ii) $3(2p + 3) - 2(p - 1)$

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[4]

8. Showing **all** your working, estimate the value of: $\frac{601.9 \times 19.94}{0.305}$

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[3]

9. Express 500 as a product of prime numbers in index form.

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[3]

10. Write down, in terms of n , the n th term of **each** of the following sequences.

(a) 3 7 11 15 19

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[2]

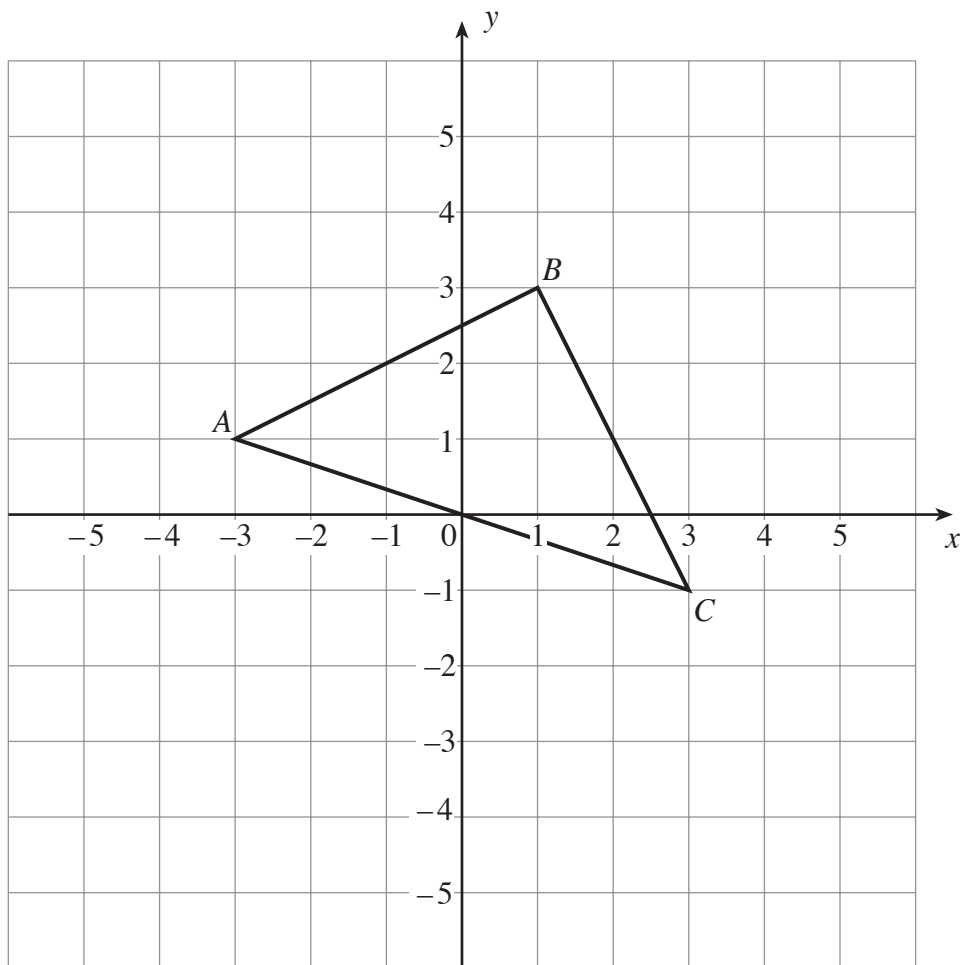
(b) 1×3 2×4 3×5 4×6

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[2]

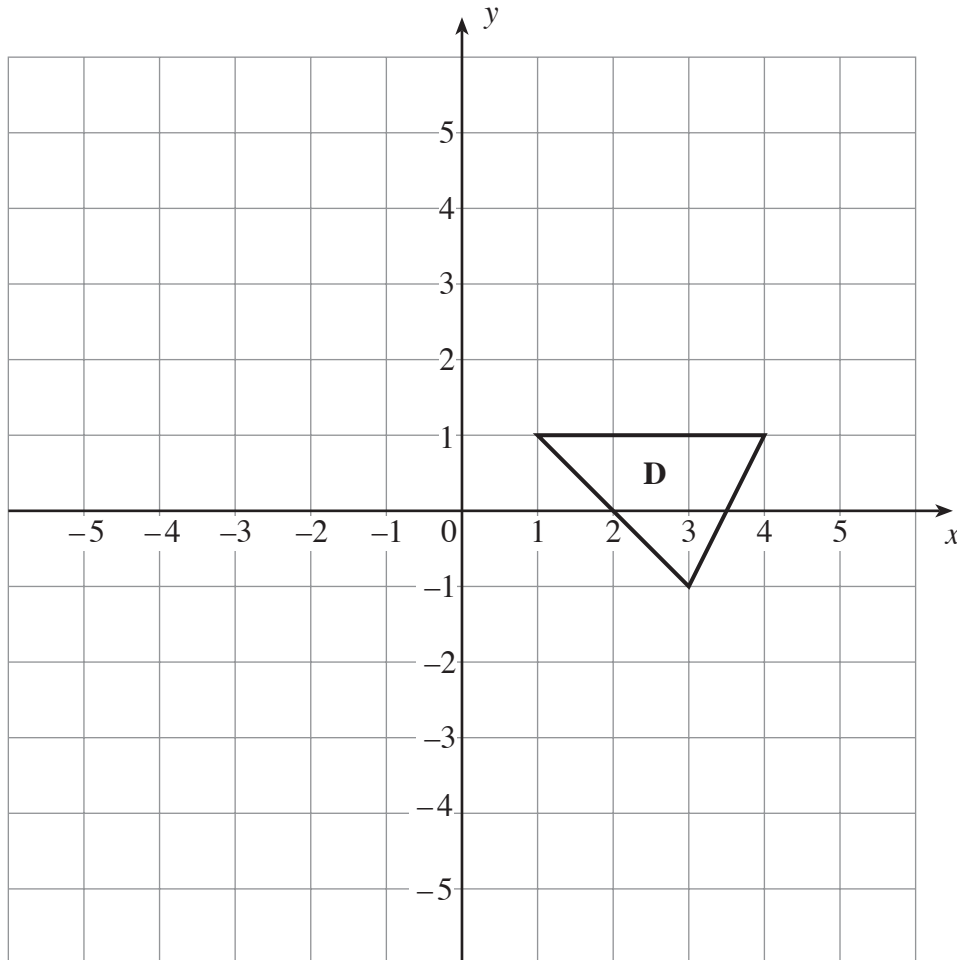
11. (a) Draw the reflection of the triangle ABC in the line $y = x$.

[2]



- (b) Rotate the triangle **D** through 90° clockwise about the point $(-1, 2)$.
Label the image **E**.

[2]



14. In each of the following formulae, every letter stands for the measurement of a length. By considering the dimensions implied by the formulae, write down, for each case, whether the formulae could be for a length, an area, a volume or none of these. The first one has been done for you.

	<u>Formula could be for</u>
$r^2 + dh$	area
$r^2(2d - h)$
$3d + 2h - r$
$5r + 6dr + 2d$

[1]

15. (a) Solve the inequality

$$13 - 3x \geq 22 - 7x.$$

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[2]

- (b) Write down the smallest whole number that satisfies this inequality.

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[1]

16. In the diagram, AB is parallel to DE .

(a) Show that triangles ABC and EDC are similar.

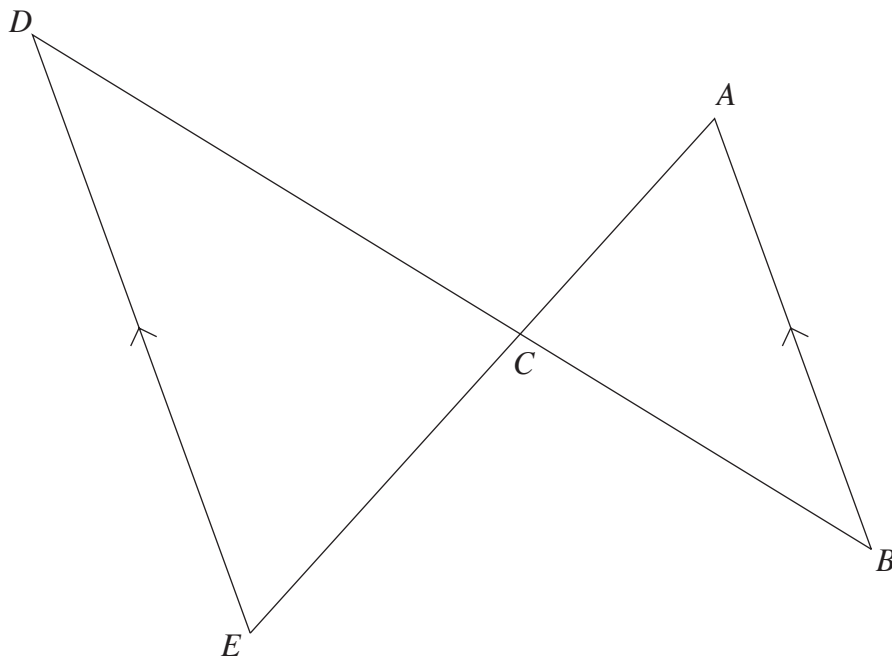


Diagram not drawn to scale.

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[2]

(b) The lengths $AB = 8\text{cm}$, $BC = 10\text{cm}$ and $DC = 15\text{cm}$.
Calculate the length of DE .

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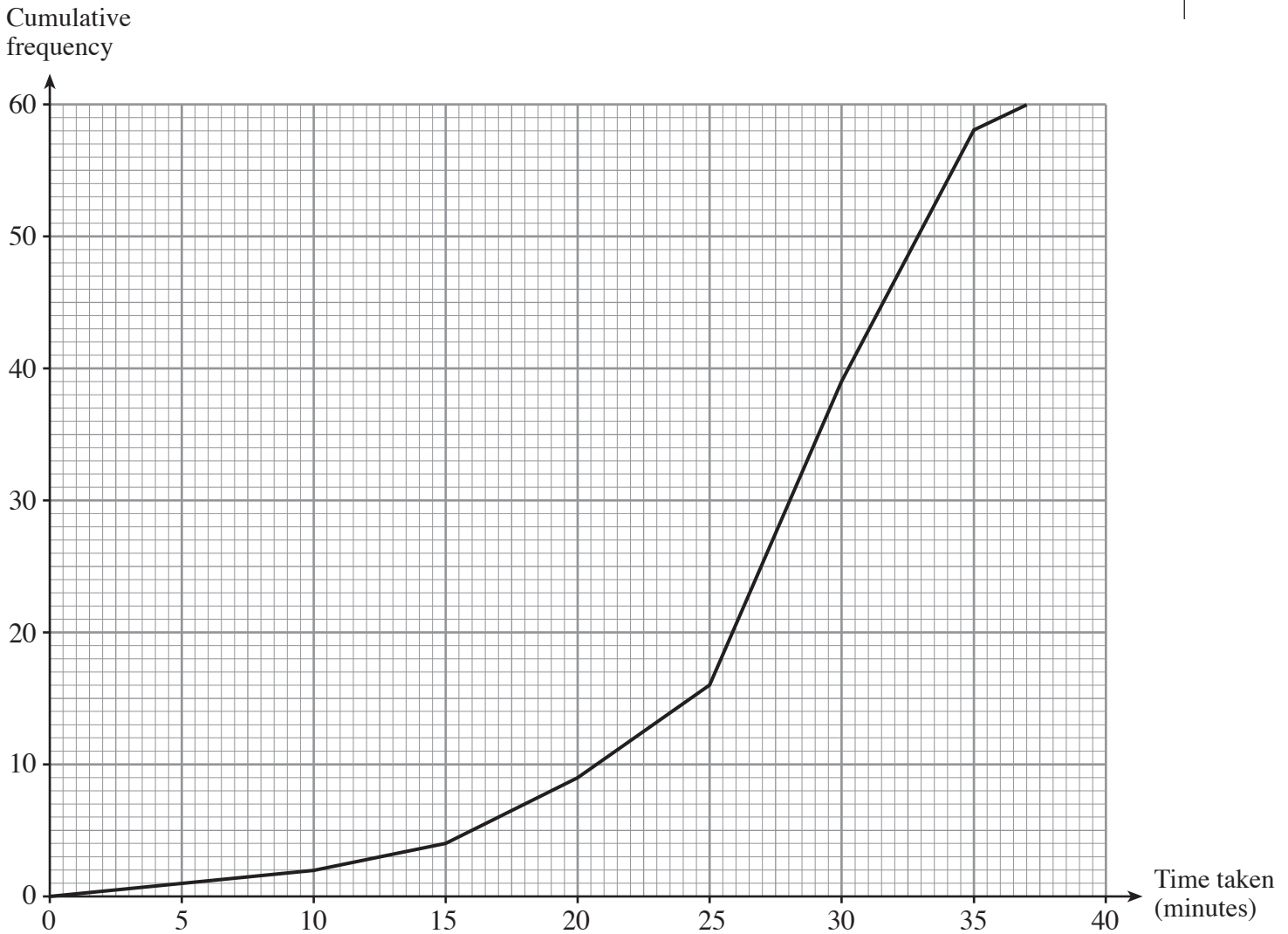
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[2]

17. Each of 60 pupils is given a task and the time taken to complete the task is recorded. The results are summarised in the cumulative frequency polygon below.



Use the cumulative frequency polygon to answer the following questions.

(a) Find an estimate for the interquartile range.

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[2]

(b) Giving full details, find an estimate for the number of pupils that take between 20 and 30 minutes to complete the task.

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[2]

18. (a) Factorise $16p^2 - 25$.

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..... [2]

(b) Factorise $4q^2 + 3q - 10$.

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19. Make h the subject of the formula

$$10(h - 2e) = 7(h - k).$$

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25. The diagram shows a quadrilateral $OABC$.

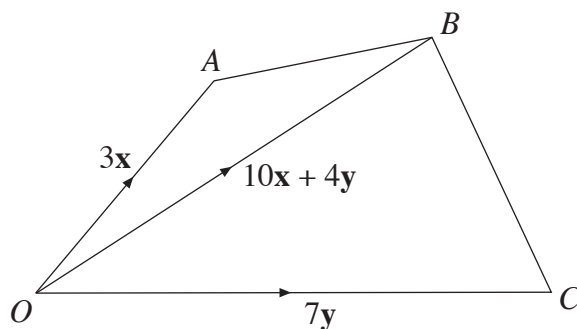


Diagram not drawn to scale.

In the quadrilateral $OABC$, the vectors \mathbf{OA} , \mathbf{OB} and \mathbf{OC} are given by $\mathbf{OA} = 3\mathbf{x}$, $\mathbf{OB} = 10\mathbf{x} + 4\mathbf{y}$ and $\mathbf{OC} = 7\mathbf{y}$.

(a) Express \mathbf{CA} in terms of \mathbf{x} and \mathbf{y} .

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[1]

(b) Given that M is the mid-point of OB , express each of the following in terms of \mathbf{x} and \mathbf{y} in their simplest form.

(i) \mathbf{OM}

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(ii) \mathbf{MA}

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[2]

(c) Does M lie on the line CA ? Give a reason for your answer.

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[1]