

Double Award GCSE Mathematics

GCSE 2

Exemplar Paper 2

(Foundation and Higher Tiers)

Time allowed: 1 hour 45 minutes

Paper total: 100 marks

Calculator allowed

This paper is one of a set of 6 exemplar papers written by MEI, covering the Foundation and Higher Tiers of GCSE 1 and 2.

The aim of these papers is to inform public discussion. They do not contribute to any existing GCSE qualification.

June 2006

Section A

You are advised to spend an hour on this section

A1. Estimate

(a) $\frac{29 \times 41}{58}$ by rounding the numbers to 1 sig. fig.

.....
(2 marks)

(b) $\frac{29 \times 41}{0.58}$ by rounding the numbers to 1 sig. fig.

.....
(1 mark)

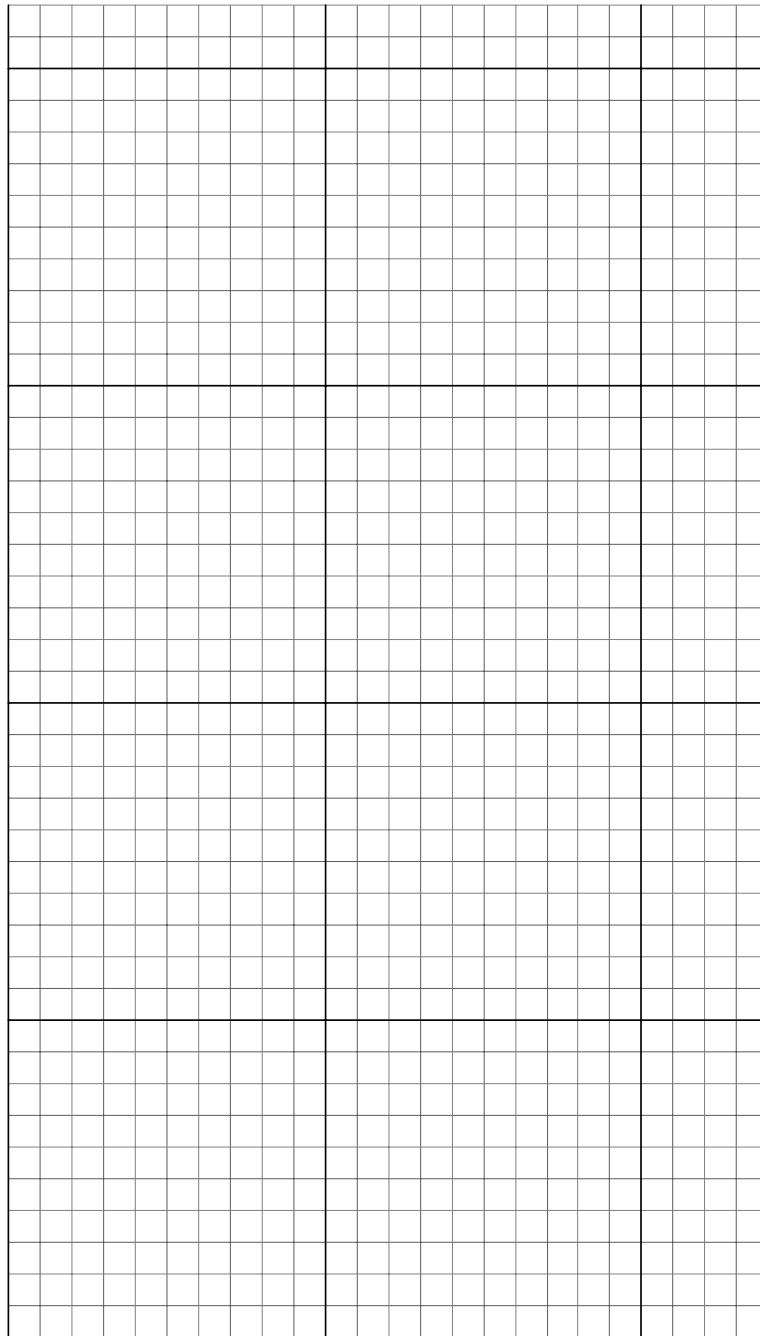
A2. Two hundred people were asked to state the time they spent watching TV last week. Here are the results of the survey:

Number of hours	Number of people		
0 - 3	34		
3 - 6	44		
6 - 9	58		
9 - 12	36		
12 - 15	18		
15 - 18	10		
Total	200		

(a) State which class contains the median.

.....
(2 marks)

(b) Draw a cumulative frequency graph for the above data.



(5 marks)

(c) Find the median time spent watching TV.

(2 marks)

(d) Estimate the percentage of people who watch less than 10 hours of TV a week.

(3 marks)

A3.

(a) Express 72 as the product of prime factors.

72 =
(3 marks)

(b) $40 = 2^3 \times 5$

(i) State the LCM of 40 and 72.

.....
(1 mark)

(ii) State the HCF of 40 and 72.

.....
(1 mark)

A4.

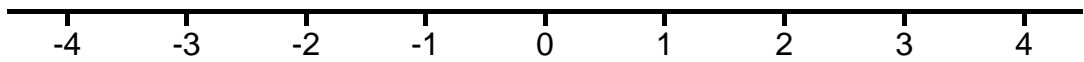
(a) Solve $3x + 2 = 5(x - 4)$

$x =$
(3 marks)

(b) Solve $5x + 7 > 2$

.....
(2 marks)

(c) Show the solution set on the number line.



(2 marks)

A5. ABCD is a parallelogram. A is at (0, 0), B is at (4, 2), C is at (2, 8).

(a) State the co-ordinates of M, the midpoint of AC.

M is at (,)
(1 mark)

(b) Find the co-ordinates of D.

D is at (,)
(2 marks)

- A6. Jan measures the heights of the girls in her class and draws a stem-and-leaf diagram to show the information.

Heights of girls

140/5 represents 145 cm

140	0	1	1	3	5	
150	4	5	7	8	9	
160	2	2	2	3	8	8
170	0	1	4			

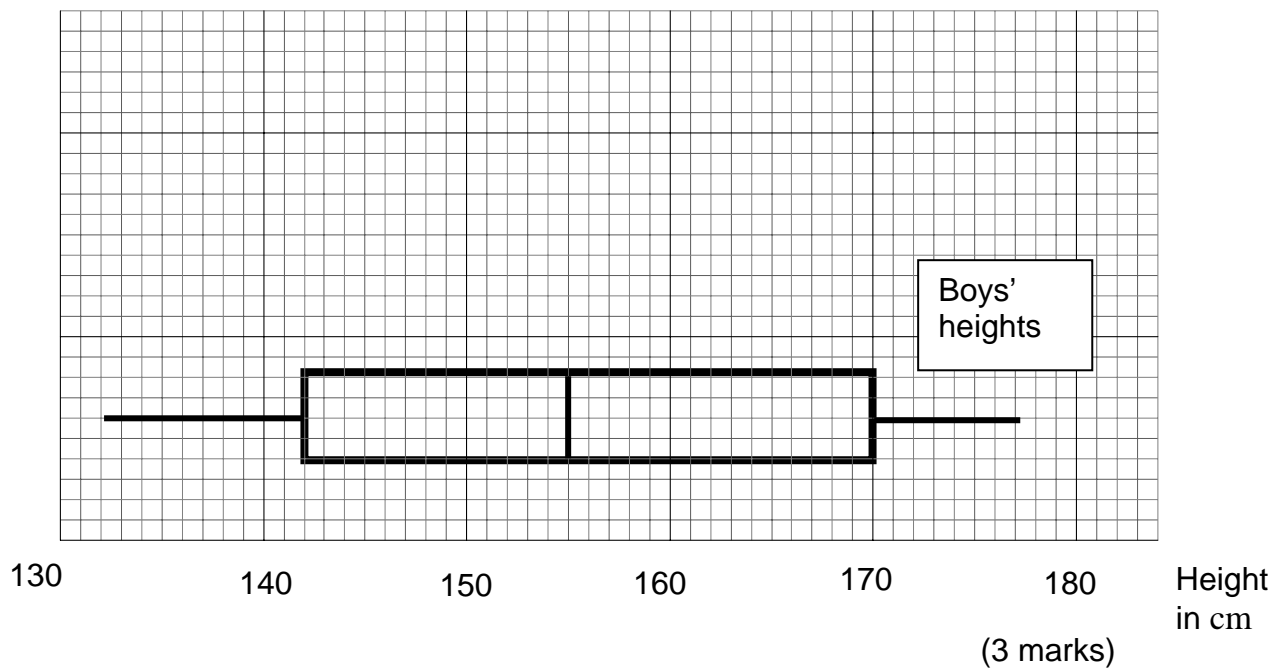
- (a) State the median height.

.....cm
(1 mark)

- (b) Find the interquartile range.

(3 marks)

- (c) A box and whisker diagram to show the height of a group of boys the same age has been drawn below. Draw a box and whisker diagram for the girls.



(d) Use the box and whisker diagrams to compare the heights of the boys and girls.

(2 marks)

A7. Solve the simultaneous equations:

$$2p - 3q = 9$$

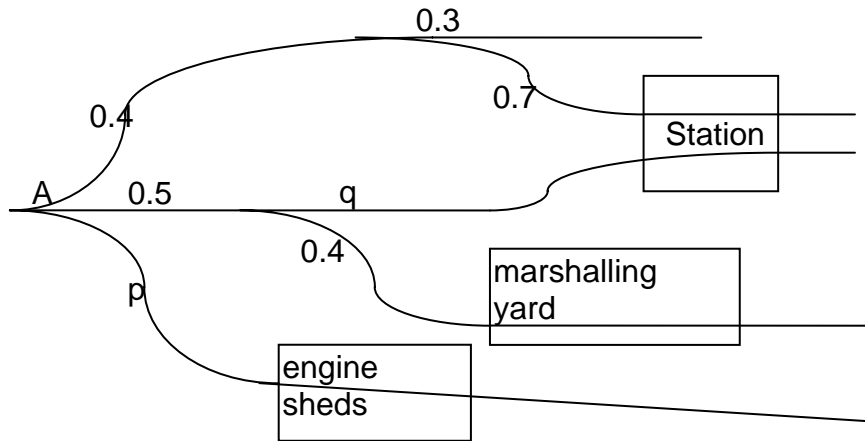
$$4p + q = 11$$

(4 marks)

A8. Expand and simplify $(x + 3)(x - 4)$

(3 marks)

- A9. Tamley's Toyshop has a model railway on display. Part of the layout is shown below. The points are moved by a random selector box. The probability that the train takes a particular route at any junction is shown.



A train passes through A.

- (a) State the values of p and q .

$p = \dots\dots\dots$
(1 mark)

$q = \dots\dots\dots$
(1 mark)

- (b) The train is expected to pass point A 20 times in each minute. How many times is it expected to pass through the engine sheds?

$\dots\dots\dots$
(2 marks)

- (c) State the probability that the train will go from A through the marshalling yard.

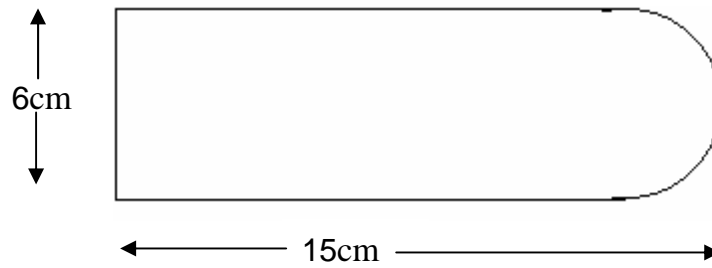
$\dots\dots\dots$
(2 marks)

(d) State the probability that the train will go through the station.

(4 marks)

A10. Find the area of the shape in this diagram.

(4 marks)



Section B

These questions are based on the prereleased material; a clean copy was issued with this paper.

You are advised to spend 45 minutes on this section.

B1. Work out the area of the shaded face in Fig. 4.

.....cm²
(2 marks)

B2. Show that the (4, 6, 12) cuboid is an equable cuboid.

(4 marks)

B3. Show, using the sizes of the interior angles, that the three regular polygons with 3-, 8- and 24-sides fit exactly around a point.

(3 marks)

B4. Showing your working, find the value of a so that the cuboid with sides of length a cm, a cm and 10 cm is equable.

$a = \dots\dots\dots$
(4 marks)

B5.

(a) Showing your working, evaluate $\frac{1}{2} - \frac{1}{3} - \frac{1}{7}$

$\dots\dots\dots$
(2 marks)

(b) Hence or otherwise, solve the equation $\frac{1}{2} = \frac{1}{3} + \frac{1}{7} + \frac{1}{x}$

$x = \dots\dots\dots$
(1 mark)

(c) Using the value of x found in part (b), find the surface area of the cuboid with sides 3cm, 7cm and x cm.

$\dots\dots\dots$
(2 marks)

B6.

(a) Show that the equation

$$\left(180^\circ - \frac{360^\circ}{a}\right) + \left(180^\circ - \frac{360^\circ}{b}\right) + \left(180^\circ - \frac{360^\circ}{c}\right) + \left(180^\circ - \frac{360^\circ}{d}\right) = 360^\circ$$

simplifies to $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d} = 1$

(3 marks)

(b) Using the interior angles, show that two squares, an equilateral triangle and a regular hexagon meet exactly at a point.

(2 marks)

(c) Explain the link between the answers to parts (a) and (b).

(2 marks)

B7. Explain why there is no equable cuboid with all sides integer lengths and two perpendicular sides each of length 7cm.

(4 marks)

B8.

(a) When a cube is assembled from the net shown in Fig. 8, mark clearly the two points that will coincide with P.

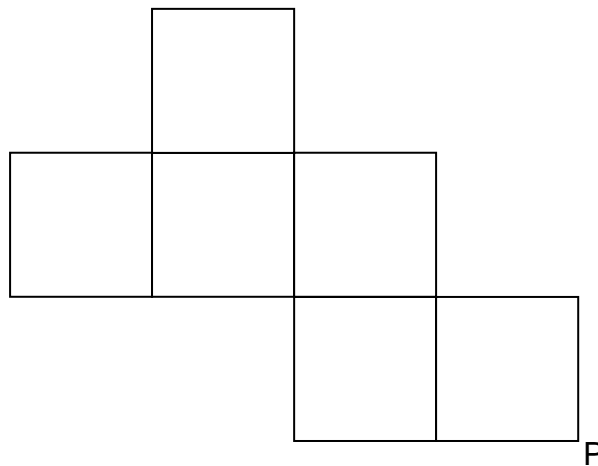


Fig. 8

(2 marks)

(b) Prove that there is only one **equable cube** and state the length of its edge.

(4 marks)

B9. The interior angle of a regular polygon with n sides is $180^\circ - \frac{360^\circ}{n}$.

Explain how this formula is derived.

(2 marks)

B10. An equable rectangle is one in which the perimeter is numerically equal to the area. Find the height of the equable rectangle which has base length

(a) 6cm,

.....cm
(1 mark)

(b) 11cm.

.....cm
(2 marks)