

Paper Reference(s)

**5503/03**

# **Edexcel GCSE**

**Mathematics A – 1387**

**Paper 3 (Non-Calculator)**

**Intermediate Tier**

**Tuesday 11 November 2003 – Morning**

**Time: 2 hours**

**Materials required for examination**

Ruler graduated in centimetres  
and millimetres, protractor,  
compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

**Items included with question papers**

Formulae sheets

## **Instructions to Candidates**

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In the boxes on the answer book, write your centre number, candidate number, your surname and initials, the paper reference and your signature.  
The paper reference is shown above. If more than one paper reference is shown, you should write the one for which you have been entered.  
Answer ALL questions in the spaces provided in this book.  
Supplementary answer sheets may be used.

## **Information for Candidates**

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The total mark for this paper is 100.  
The marks for the various parts of questions are shown in round brackets: e.g. (2).  
**Calculators must not be used.**  
This paper has 23 questions.

## **Advice to Candidates**

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Show all stages in any calculations.  
Work steadily through the paper.  
Do not spend too long on one question.  
If you cannot answer a question leave it out and attempt the next one.  
Return at the end to those you have left out.

**Answer ALL TWENTY THREE questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

1. (a) Write down all the prime numbers between 40 and 50.

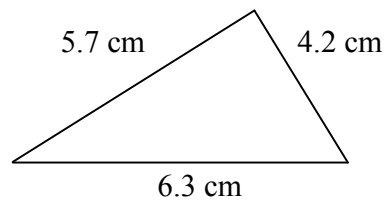
.....  
(2)

- (b) Write down the cube of 10.

.....  
(1)

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2. Here is a sketch of a triangle.



In the space below, use ruler and compasses to **construct** this triangle accurately. You must show all construction lines.

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(3)

3. A litre of petrol costs 84p.  
Work out the cost of 26 litres of petrol.  
Give your answer in pounds.

£.....  
**(3)**

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4. The table shows information about the number of fillings the students in a class had last year.

Number of fillings	Number of students
0	10
1	5
2	4
3	2
More than 3	1

The headteacher is to choose a student at random from the class.

Find the probability that she will choose a student who had

- (i) exactly 1 filling,

.....  
**(1)**

- (ii) 2 or more fillings,

.....  
**(1)**

- (iii) either 1 filling or 2 fillings.

.....  
**(1)**

5. A customer who cancels a holiday with Funtours has to pay a cancellation charge. The cancellation charge depends on the number of days before the departure date the customer cancels the holiday. The cancellation charge is a percentage of the cost of the holiday. The table shows the percentages.

Number of days before the departure date the customer cancels the holiday	Percentage of the cost of the holiday
29–55	40%
22–28	60%
15–21	80%
4–14	90%
3 or less	100%

The cost of Amy’s holiday was £840.  
She cancelled her holiday 25 days before the departure date.

- (a) Work out the cancellation charge she had to pay.

£.....  
(2)

The cost of Carol’s holiday was £600.  
She cancelled her holiday and had to pay a cancellation charge of £480.

- (b) Work out £480 as a percentage of £600.

.....%  
(2)

Ravi cancelled his holiday 30 days before the departure date.  
He had to pay a cancellation charge of £272.

(c) Work out the cost of his holiday.

£.....  
(2)

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6. The first term of a sequence is 7.  
The rule for the sequence is **Add 5 to the previous term.**

(a) Write down the second term and the third term of the sequence.

....., .....,  
(1)

(b) Work out the 10th term of the sequence.

.....  
(2)

(c) Write down an expression, in terms of  $n$ , for the  $n$ th term of the sequence.

.....  
(2)

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7. (a) Work out the value of  $3p + 4q$  when  $p = 5$  and  $q = -2$

.....  
(2)

- (b) Given that  $y = 4x - 3$ , work out the value of  $x$  when  $y = 11$

$x =$  .....  
(3)

- (c) Multiply out  $7(n - 3)$

.....  
(1)

- (d) Factorise  $t^2 - 5t$

.....  
(2)

- 
8. Brass is made up of copper and zinc.  
Every 100 grams of brass contains 20 grams of zinc.

- (a) Work out the weight of zinc in 60 grams of brass.

..... g  
(2)

Brass contains 4 parts by weight of copper to 1 part by weight of zinc.

- (b) Work out the weight of copper in 350 grams of brass.

..... g  
(2)



9.

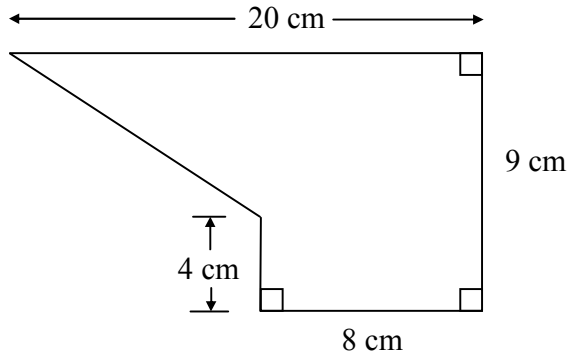


Diagram **NOT** accurately drawn

The diagram shows a shape.  
Work out the area of the shape.

..... cm<sup>2</sup>  
**(4)**

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10. (a) Express 120 as the product of powers of its prime factors.

.....  
**(3)**

(b) Find the Lowest Common Multiple of 120 and 150.

.....  
**(2)**

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11. This table is used to find numbers of rolls of insulation material needed for lofts of different floor areas.

Floor area of loft ( $A$ square feet)	Number of rolls ( $n$ )
300	6
350	7
400	8
450	9
500	10
550	11

The floor of a rectangular loft is 30 feet long and 15 feet wide.

- (a) (i) Work out the floor area of this loft.

..... square feet

- (ii) Write down the number of rolls of insulation material needed for this loft.

.....  
(3)

$n$  is the number of rolls of insulation material needed for a loft with a floor area of  $A$  square feet.

- (b) Express  $n$  in terms of  $A$ .

$n =$  .....  
(2)

Loft insulation reduces annual heating costs by 20%.

**After** he insulated his loft, Curtley's annual heating cost was £520.

- (c) Work out Curtley's annual heating cost would have been, if he had not insulated his loft.

£.....  
(3)

12. Jan measures the heights, in millimetres, of 20 plants in her greenhouse. Here are her results.

178	189	147	147	166
167	153	171	164	158
189	166	165	155	152
147	158	148	151	172

Complete the stem and leaf diagram to show this information.

Stem	Leaf

(3)

13. Change  $8 \text{ m}^3$  to  $\text{cm}^3$ .

..... $\text{cm}^3$   
(2)

14. (a) Work out  $\frac{2}{5} + \frac{3}{8}$

.....  
(2)

(b) Work out  $5\frac{2}{3} - 2\frac{3}{4}$

.....  
(3)

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15. Simplify

(i)  $p^2 \times p^7$

.....

(ii)  $x^8 \div x^3$

.....  
(2)

16. The mass of  $5 \text{ m}^3$  of copper is 44 800 kg.

(a) Work out the density of copper.

..... $\text{kg/m}^3$   
(2)

The density of zinc is  $7130 \text{ kg/m}^3$ .

(b) Work out the mass of  $5 \text{ m}^3$  of zinc.

.....kg  
(2)

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17. The grouped frequency table shows information about the weights, in kilograms, of 20 students, chosen at random from Year 11.

Weight ( $w$ kg)	Frequency
$50 \leq w < 60$	7
$60 \leq w < 70$	8
$70 \leq w < 80$	3
$80 \leq w < 90$	2

There are 300 students in Year 11.

Work out an estimate for the number of students in Year 11 whose weight is between 50 kg and 60 kg.

.....  
**(3)**

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18. The fraction,  $p$ , of an adult's dose of medicine which should be given to a child who weighs  $w$  kg is given by the formula

$$p = \frac{3w + 20}{200}$$

A child weighs 35 kg.

- (a) Work out the fraction of an adult's dose which should be given to this child.  
Give your answer as a fraction in its simplest form.

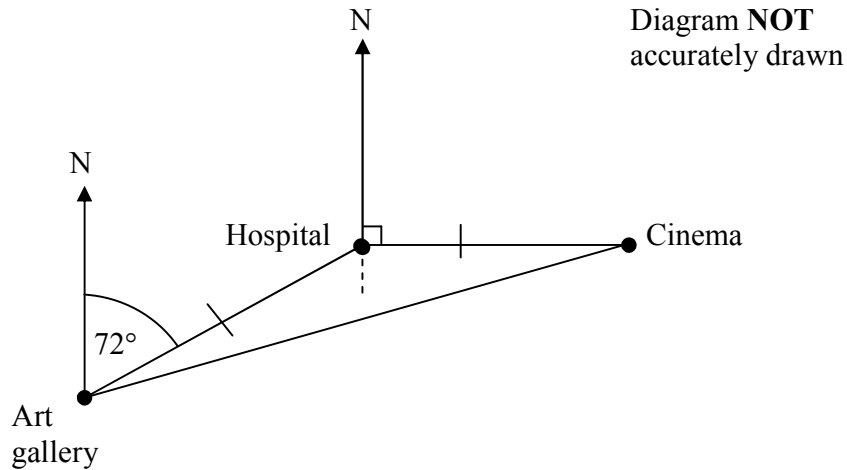
.....  
(2)

- (b) Use the formula  $p = \frac{3w + 20}{200}$  to find the weight of a child whose dose is the same as an adult's dose.

..... kg  
(3)

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19.



The diagram shows the position of each of three buildings in a town.  
 The bearing of the Hospital from the Art gallery is  $072^\circ$ .  
 The Cinema is due East of the Hospital.  
 The distance from the Hospital to the Art gallery is equal to the distance from the Hospital to the Cinema.

Work out the bearing of the Cinema from the Art gallery.

.....<sup>o</sup>  
**(3)**

20. Here are some expressions.

$\frac{1}{2}ac$	$\pi c$	$2b$	$2ab^2$	$abc$	$a(b+c)$	$\frac{ab}{c}$	$\pi a^2$

The letters  $a$ ,  $b$  and  $c$  represent lengths.  
 $\pi$ ,  $2$  and  $\frac{1}{2}$  are numbers which have no dimensions.  
 Three of the expressions could represent areas.  
 Tick ( $\checkmark$ ) the boxes underneath the **three** expressions which could represent areas.

**(3)**



21. The table shows information about the heights of 40 bushes.

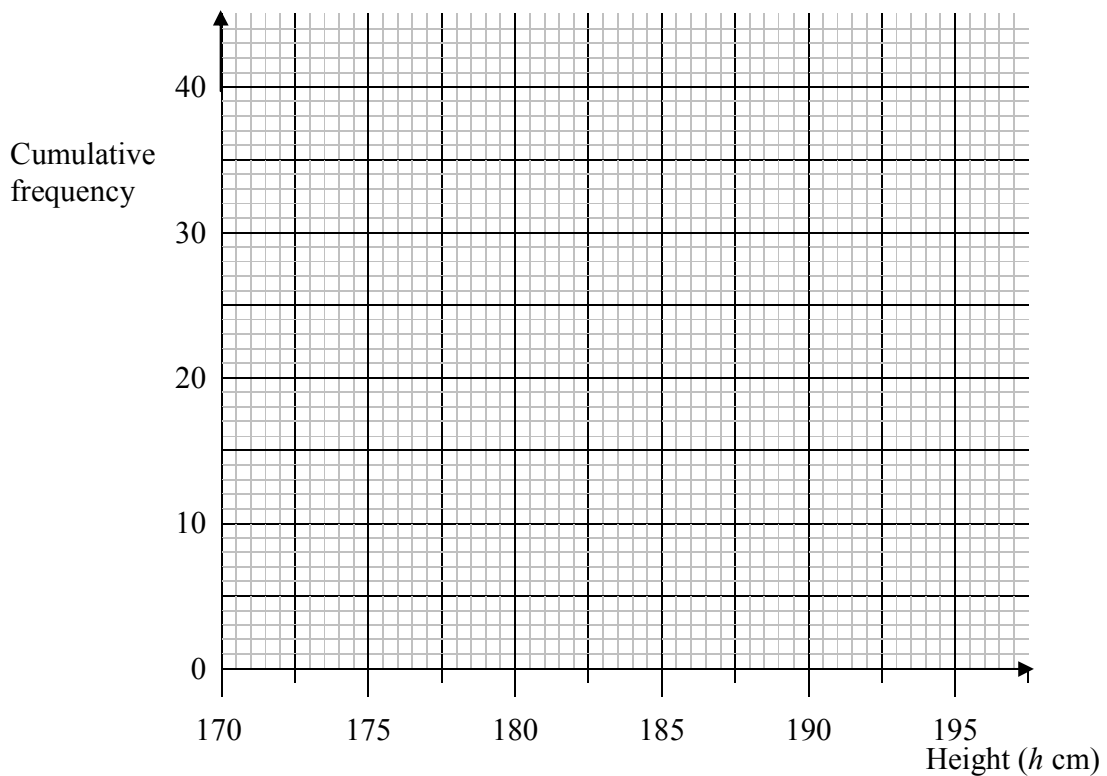
Height ( $h$ cm)	Frequency
$170 \leq h < 175$	5
$175 \leq h < 180$	18
$180 \leq h < 185$	12
$185 \leq h < 190$	4
$190 \leq h < 195$	1

(a) Complete the cumulative frequency table.

Height ( $h$ cm)	Cumulative Frequency
$170 \leq h < 175$	
$175 \leq h < 180$	
$180 \leq h < 185$	
$185 \leq h < 190$	
$190 \leq h < 195$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Use the graph to find an estimate for the median height of the bushes.

..... cm  
(1)

22.

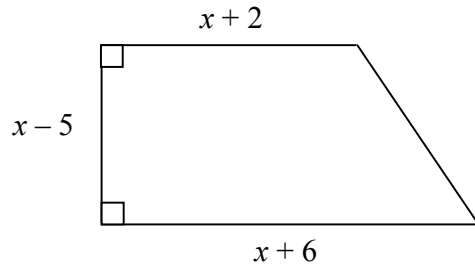


Diagram **NOT** accurately drawn

The diagram shows a trapezium.  
The lengths of three of the sides of the trapezium are  $x - 5$ ,  $x + 2$  and  $x + 6$ .  
All measurements are given in centimetres.

The area of the trapezium is  $36 \text{ cm}^2$ .

(a) Show that  $x^2 - x - 56 = 0$

(4)

(b) (i) Solve the equation  $x^2 - x - 56 = 0$

.....

(ii) Hence find the length of the shortest side of the trapezium.

..... cm  
(4)

23.

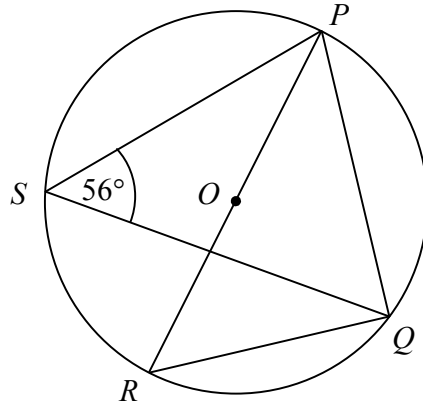


Diagram **NOT** accurately drawn

$P, Q, R$  and  $S$  are points on the circumference of a circle, centre  $O$ .  
 $PR$  is a diameter of the circle.  
Angle  $PSQ = 56^\circ$ .

- (a) Find the size of angle  $PQR$ .  
Give a reason for your answer.

.....<sup>o</sup>  
(2)

- (b) Find the size of angle  $PRQ$ .  
Give a reason for your answer.

.....<sup>o</sup>  
(2)

- (c) Find the size of angle  $POQ$ .  
Give a reason for your answer.

.....<sup>o</sup>  
(2)

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**TOTAL FOR PAPER: 100 MARKS**

**END**