



General Certificate of Secondary Education

Centre Number

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Candidate Number

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# Mathematics

Unit M7 Paper 1  
(Non-Calculator)  
Higher Tier



ML

[GMC71]  
Assessment

Assessment Level of Control Tick the relevant box (✓)

Controlled Conditions	
Other	

## TIME

1 hour 15 minutes, plus your additional time allowance.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write outside the boxed area on each page, on blank pages or tracing paper.**

Complete in black ink only. **Do not write with a gel pen.**

Answer **all seventeen** questions.

All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

You **must not** use a calculator for this paper.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 50.

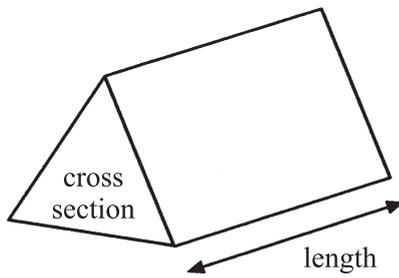
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a ruler, compasses and a protractor.

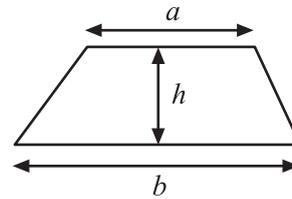
The Formula Sheet is on page 2.

# Formula Sheet

**Volume of prism** = area of cross section  $\times$  length

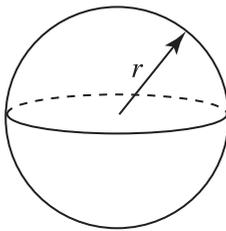


**Area of trapezium** =  $\frac{1}{2}(a+b)h$



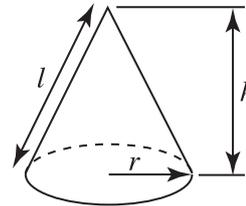
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

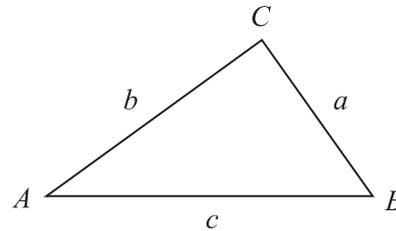


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

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



**In any triangle ABC**



**Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$   
where  $a \neq 0$ , are given by

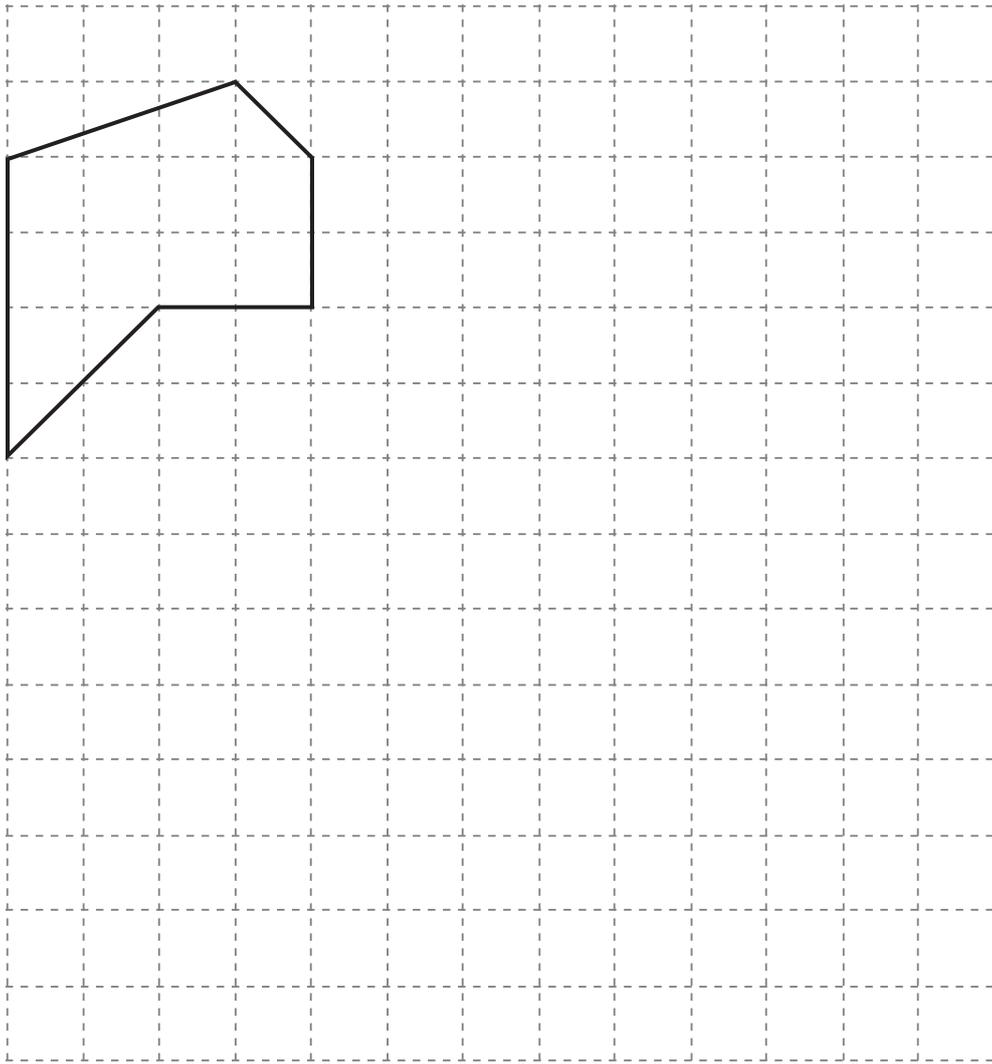
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**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** =  $\frac{1}{2} ab \sin C$

1 (a) On the grid, enlarge the shape with a scale factor of 2



[2]

(b) How many times bigger is the area of the enlarged shape than the smaller shape?

Answer \_\_\_\_\_ [2]

[Turn over

2 Which of the numbers below shows that the following statement is not true?

“If P is any odd number, then P + 2 is always a prime number.”

Show all your working out before you tick the correct box.

P = 1

P = 5

P = 3

P = 7

[2]

3 Change 20 miles/h to km/h.

Answer \_\_\_\_\_ km/h [2]

4 In a Year 12 class, the following information was recorded.

	Boys	Girls
Wears glasses	3	5
Does not wear glasses	10	6

(a) What fraction of the pupils in the class wear glasses?

Answer \_\_\_\_\_ [2]

(b) A pupil was chosen at random from the class.

What is the probability that the pupil was a boy who does not wear glasses?

Answer \_\_\_\_\_ [1]

(c) The next week a new boy joins the class.

He wears glasses.

Will this change the probability of now choosing at random a girl who wears glasses?

**Explain your answer clearly.**

Answer \_\_\_\_\_ because \_\_\_\_\_ [2]

[Turn over

5 Sam and Julie share £35 in the ratio 6 : 1

How much is each share?

Answer Sam £ \_\_\_\_\_

Julie £ \_\_\_\_\_ [2]

6 “Look Dad,” said Erin.

“Here are all the silver coins from my piggy bank.”

“How much have you got?” said Dad.

“ $\frac{1}{3}$  are 5p coins,  $\frac{1}{4}$  are 10p coins and the other 10 coins are 50p coins,” said Erin.

What is Erin’s total amount of money?

**Show all your working out.**

Answer \_\_\_\_\_ [5]

[Turn over

7 ABCDE is a pentagon.

Lines AF and CG are straight lines.

Work out the value of  $x + y + z$

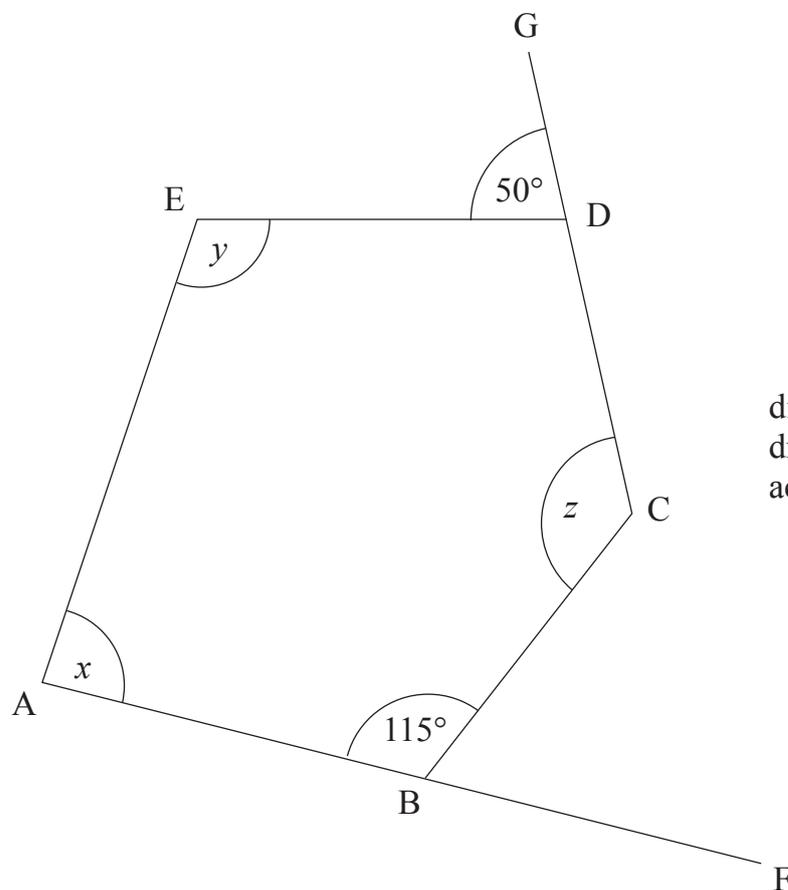


diagram not  
drawn  
accurately

Answer \_\_\_\_\_  $^\circ$  [5]

8 Simplify each of the following.

(a)  $4p^3 \times 3p^4$

Answer \_\_\_\_\_ [1]

(b)  $(q^2)^3 \div q^8$

Answer \_\_\_\_\_ [1]

9 Find the  $n$ th term of the sequence

7, 4, 1, -2, .....

Answer  $n$ th term = \_\_\_\_\_ [2]

10 Tom tests a six-sided dice which he thinks is biased towards the even numbers.

He does an experiment by rolling the dice.

He records the results as E (even) or O (odd).

E O E O E E O E E O E O

(a) What is the relative frequency of an even number?

Answer \_\_\_\_\_ [1]

(b) How could Tom improve the experiment?

Answer \_\_\_\_\_ [1]

11 Make  $y$  the subject of

$$3y - 12 = 4x$$

Answer  $y =$  \_\_\_\_\_ [2]

12 A rectangle has a length of  $3x$  cm and a width of  $(x + 5)$  cm.

The length is greater than the width.

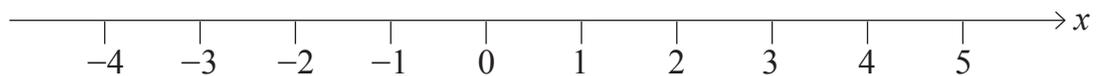
(a) Write this information as an inequality in  $x$ .

Answer \_\_\_\_\_ [1]

(b) (i) Solve the inequality.

Answer \_\_\_\_\_ [1]

(ii) Show your answer on the number line below.

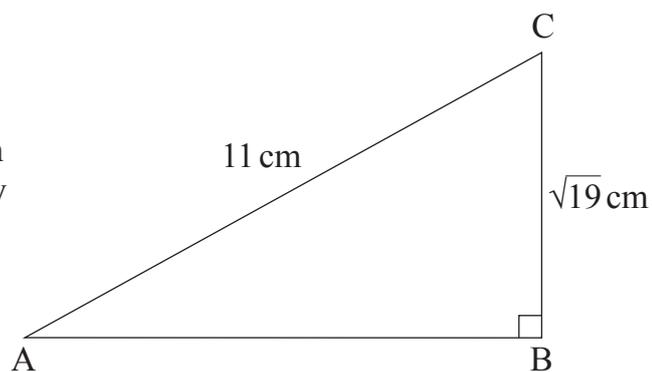


[1]

[Turn over

13

diagram  
not drawn  
accurately

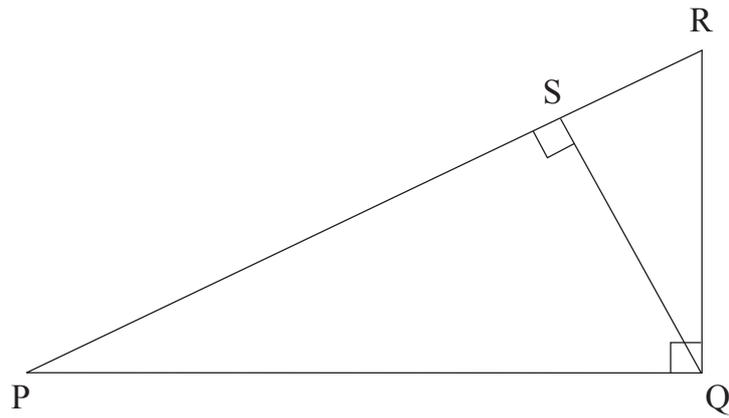


ABC is a right-angled triangle.

Work out the length of AB, giving your answer as a surd.

Answer \_\_\_\_\_ cm [3]

14



PQR is a right-angled triangle and QS is the perpendicular line from Q to PR.

Prove that the triangles PQR and QSR are similar.

[3]

[Turn over

**Special Menu**  
Two Courses (starter and main  
or main and dessert) £15.95

**Starters**

Soup of the Day  
Caesar Salad  
Baked Brie  
Bruschetta

**Mains**

Fish of the Day  
Chicken Kiev  
Pork Medallions  
Ribeye Steak (£3 supplement)  
Spaghetti Bolognese

**Desserts**

Cheesecake  
Apple Pie  
Ice Cream

A restaurant has the above Special Menu available.

How many different ways are there of choosing two courses (starter and main or main and dessert)?

Answer \_\_\_\_\_ [3]

16 Re-arrange the formula to make  $r$  the subject.

$$V = \frac{4}{3}\pi r^3$$

Answer \_\_\_\_\_ [2]

17 The height of a balloon,  $h$ , varies directly as the square root of its surface area,  $A$ .

When the balloon's surface area is 81 its height is 12

What is its height when its surface area is 144?

Answer \_\_\_\_\_ [3]

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**THIS IS THE END OF THE QUESTION PAPER**

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**DO NOT WRITE ON THIS PAGE**

<b>For Examiner's use only</b>	
<b>Question Number</b>	<b>Marks</b>
1	
2	
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17	

<b>Total Marks</b>	
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**Examiner Number**

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