



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



**MV18**

[GMC71]  
Assessment

Assessment Level of Control Tick the relevant box (✓)

**Time**

Controlled Conditions	
Other	

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 on blank pages or tracing paper.**

Complete in black ink only.

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.

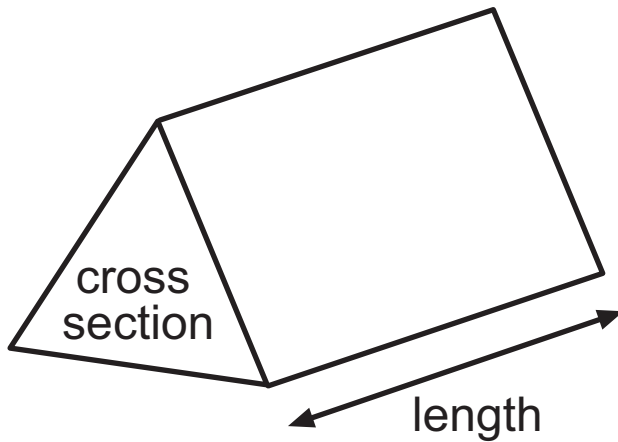
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

You should have a ruler, compasses and a protractor.

The Formula Sheet is on pages 2 and 3.

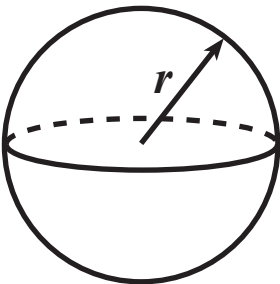
# Formula Sheet

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



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

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



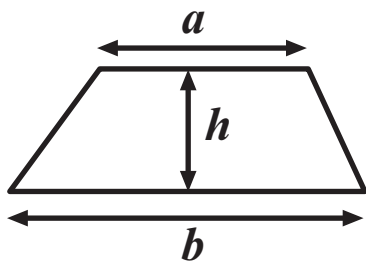
## Quadratic Equation

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

where  $a \neq 0$ , are given by

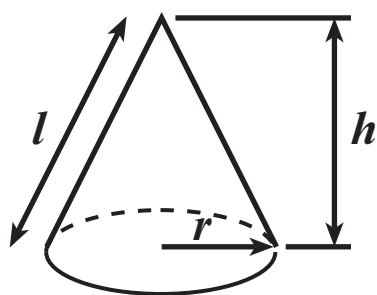
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

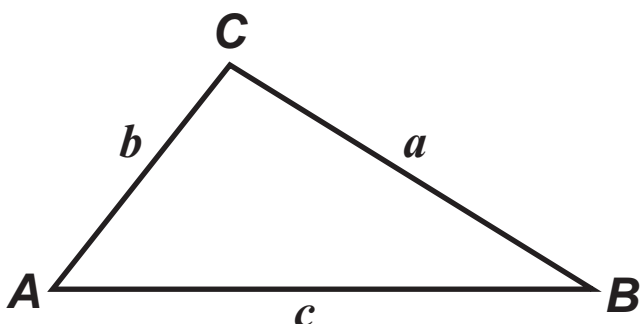


$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Curved surface area of cone} = \pi r l$$



In any triangle **ABC**

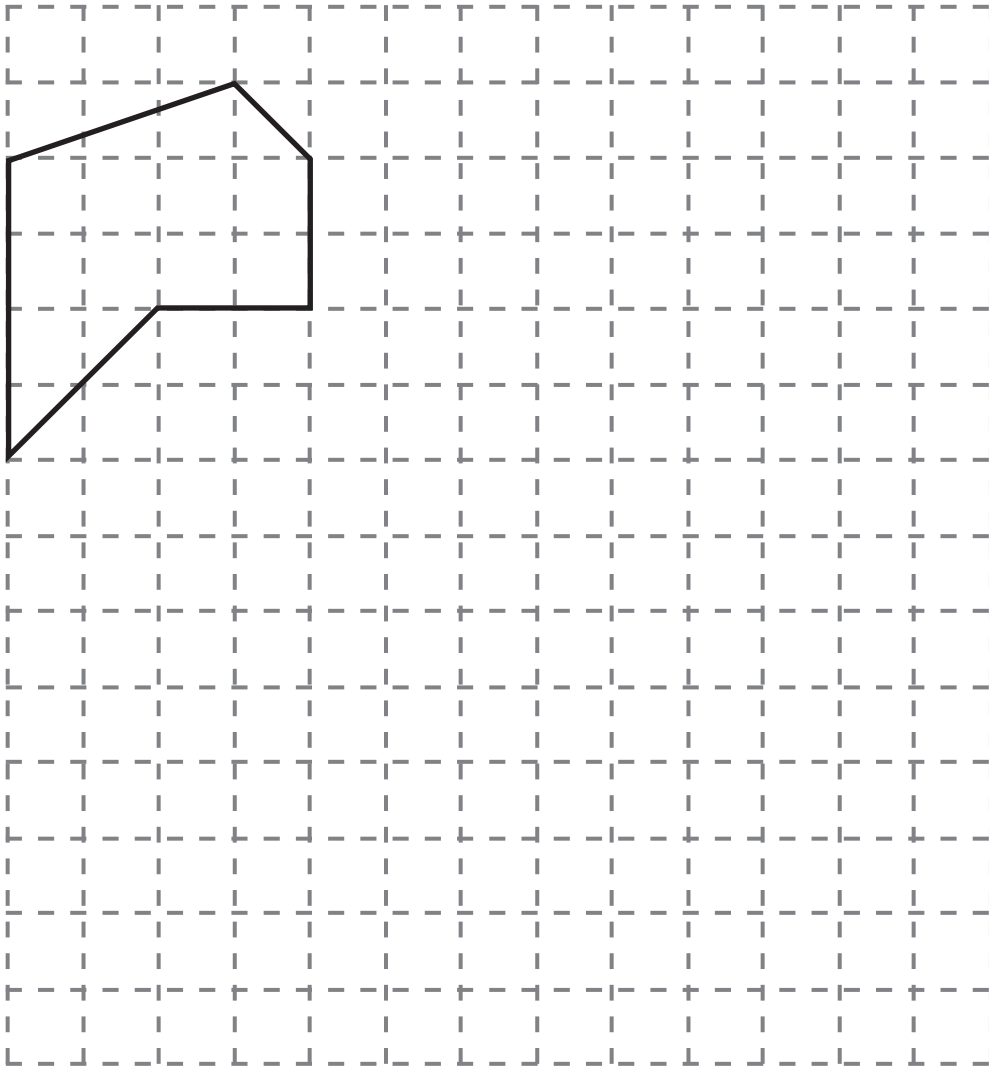


$$\text{Sine Rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{Cosine Rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

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

- 1 (a) On the grid, enlarge the shape with a scale factor of 2  
[2 marks]



- (b) How many times bigger is the area of the enlarged shape than the smaller shape? [2 marks]

Answer \_\_\_\_\_

- 2 Which of the numbers below shows that the following statement is not true? [2 marks]

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

**Show all working before you tick the correct box.**

$P = 1$

$P = 5$

$P = 3$

$P = 7$

- 
- 3 Change 20 miles/h to km/h. [2 marks]

Answer \_\_\_\_\_ km/h

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

	Boys	Girls
<b>Wears glasses</b>	3	5
<b>Does not wear glasses</b>	10	6

(a) What fraction of the pupils in the class wear glasses?  
[2 marks]

Answer \_\_\_\_\_

(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? [1 mark]

Answer \_\_\_\_\_

(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? [2 marks]

**Explain your answer clearly.**

Answer \_\_\_\_\_ because \_\_\_\_\_  
\_\_\_\_\_

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

How much is each share? [2 marks]

Answer

Sam £ \_\_\_\_\_

Julie £ \_\_\_\_\_

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? [5 marks]

**Show all working.**

Answer \_\_\_\_\_



7 ABCDE is a pentagon.

Lines AF and CG are straight lines.

Work out the value of  $x + y + z$  [5 marks]

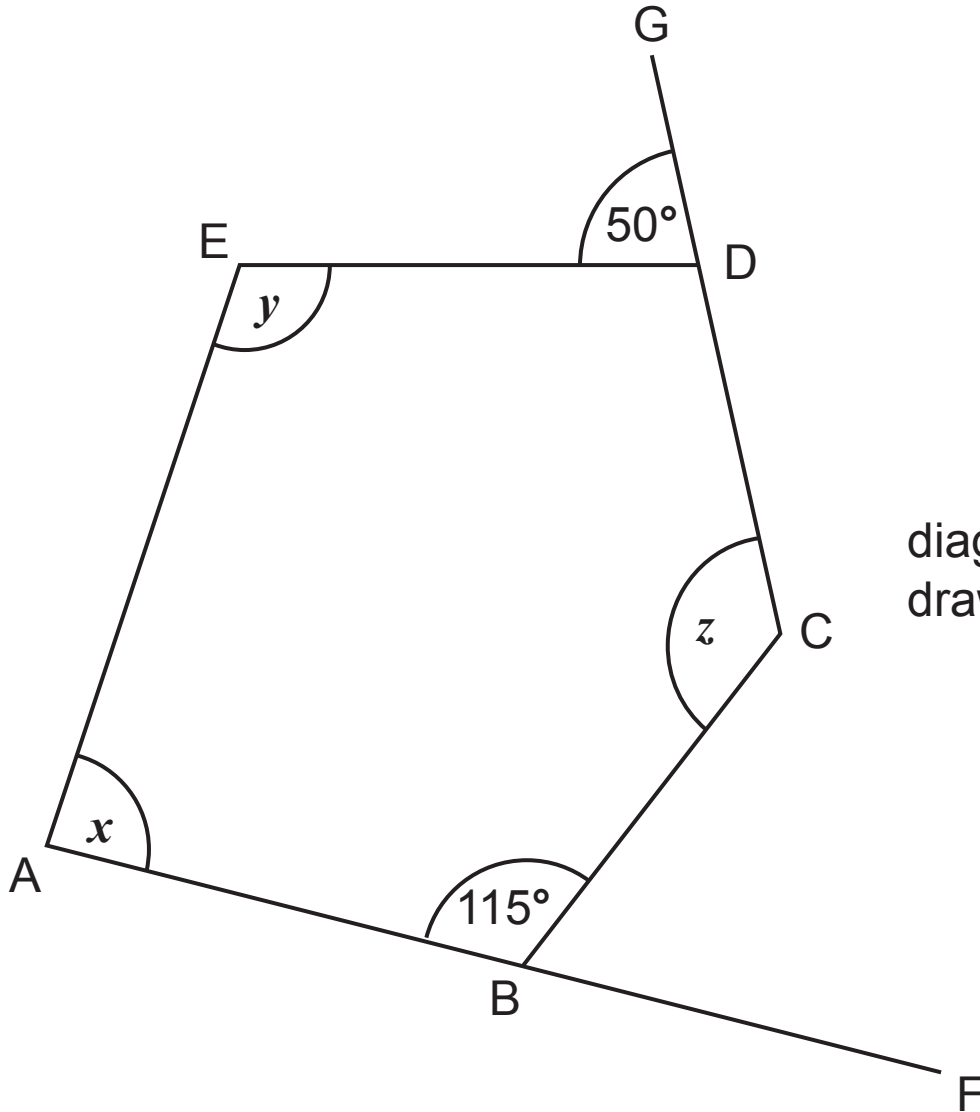


diagram not  
drawn accurately

Answer \_\_\_\_\_<sup>o</sup>

8 Simplify each of the following. [1 mark for each]

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

Answer \_\_\_\_\_

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

Answer \_\_\_\_\_

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9 Find the  $n$ th term of the sequence [2 marks]

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

Answer  $n$ th term = \_\_\_\_\_

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

He carries out 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?  
[1 mark]

Answer \_\_\_\_\_

**(b)** How could Tony improve the experiment? [1 mark]

Answer \_\_\_\_\_

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**11** Make  $y$  the subject of [2 marks]

$$3y - 12 = 4x$$

Answer  $y =$  \_\_\_\_\_

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

The length is greater than the width.

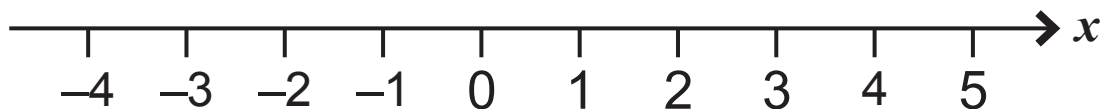
**(a)** Write this information as an inequality in  $x$ . [1 mark]

Answer \_\_\_\_\_

**(b) (i)** Solve the inequality. [1 mark]

Answer \_\_\_\_\_

**(ii)** Show your answer on the number line below.  
[1 mark]



13

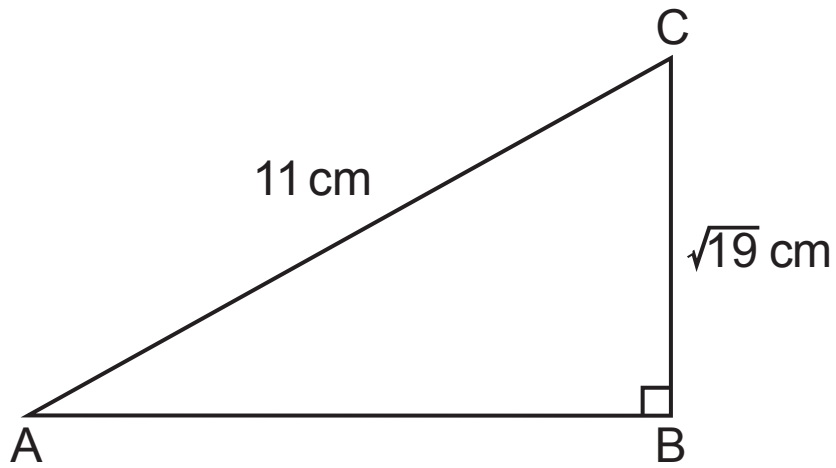


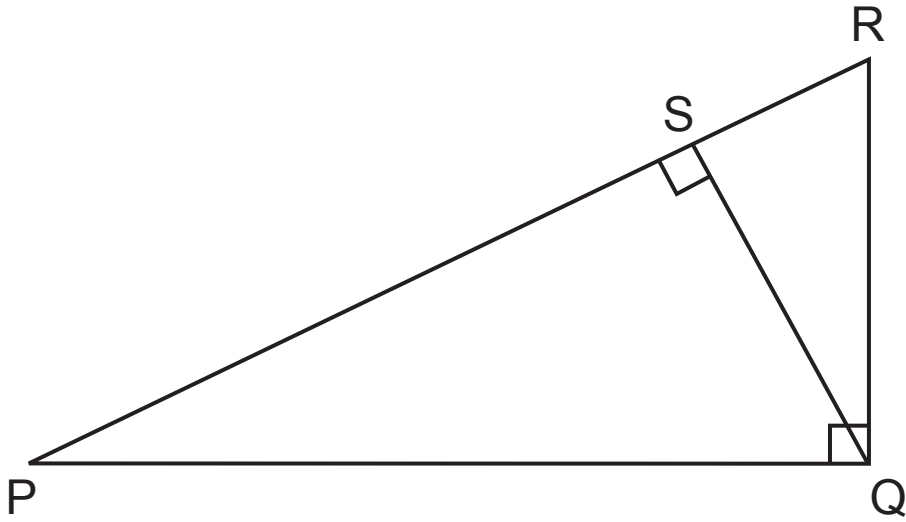
diagram not  
drawn accurately

ABC is a right-angled triangle.

Work out the length of AB, giving your answer as a surd.  
[3 marks]

Answer \_\_\_\_\_ cm

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 marks]

## 15 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)? [3 marks]

Answer \_\_\_\_\_

**16** Re-arrange the formula to make  $r$  the subject. [2 marks]

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

Answer \_\_\_\_\_

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**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? [3 marks]

Answer \_\_\_\_\_



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**This is the end of the question paper**

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For Examiner's use only	
Question Number	Marks
1	
2	
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17	

<b>Total Marks</b>	
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Examiner Number

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