Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Mathematics

Unit M7 Paper 2
(With calculator)
Higher Tier

MV24

[GMC72]

THURSDAY 6 JUNE, 10.45am–12 noon

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 on blank pages or tracing paper.

Complete in black ink only.

Answer **all sixteen** questions.

All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

Information for Candidates

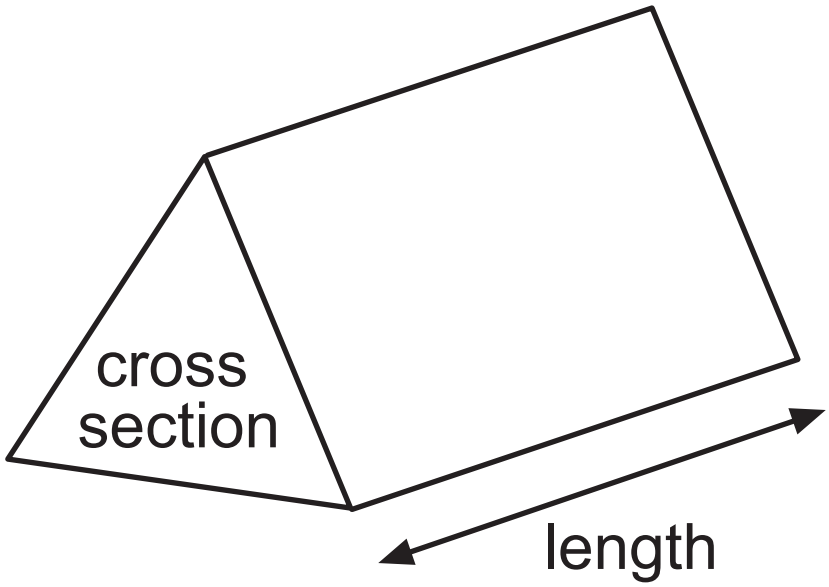
The total mark for this paper is 50.
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on pages 4 and 5.

Blank Page

(Formula sheet overleaf)

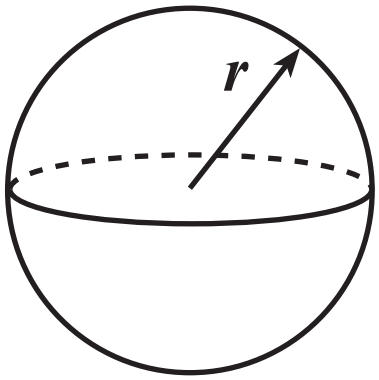
Formula Sheet

Volume of prism = area of cross section × length



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

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



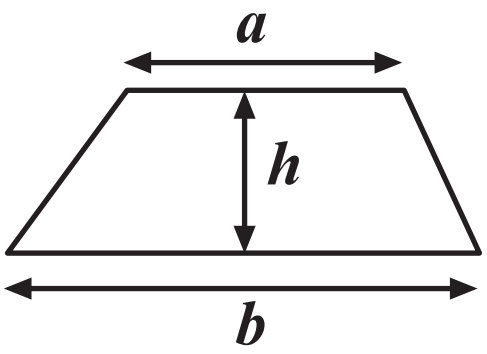
Quadratic Equation

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

where $a \neq 0$, are given by

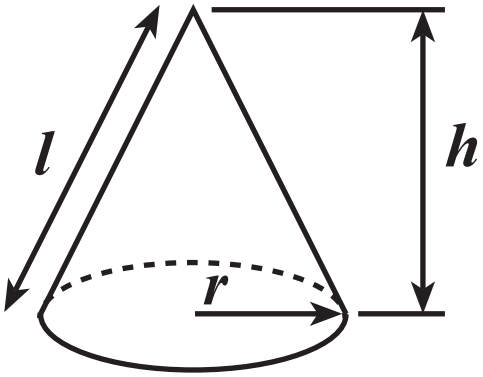
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

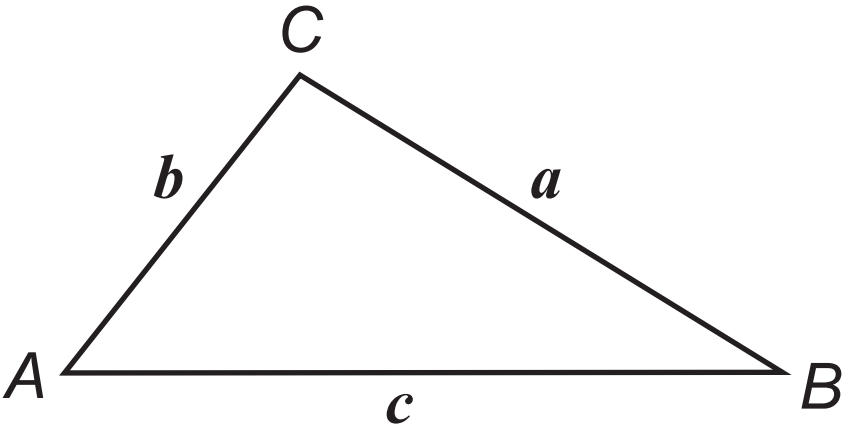


Volume of cone $= \frac{1}{3}\pi r^2 h$

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



In any triangle *ABC*



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

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

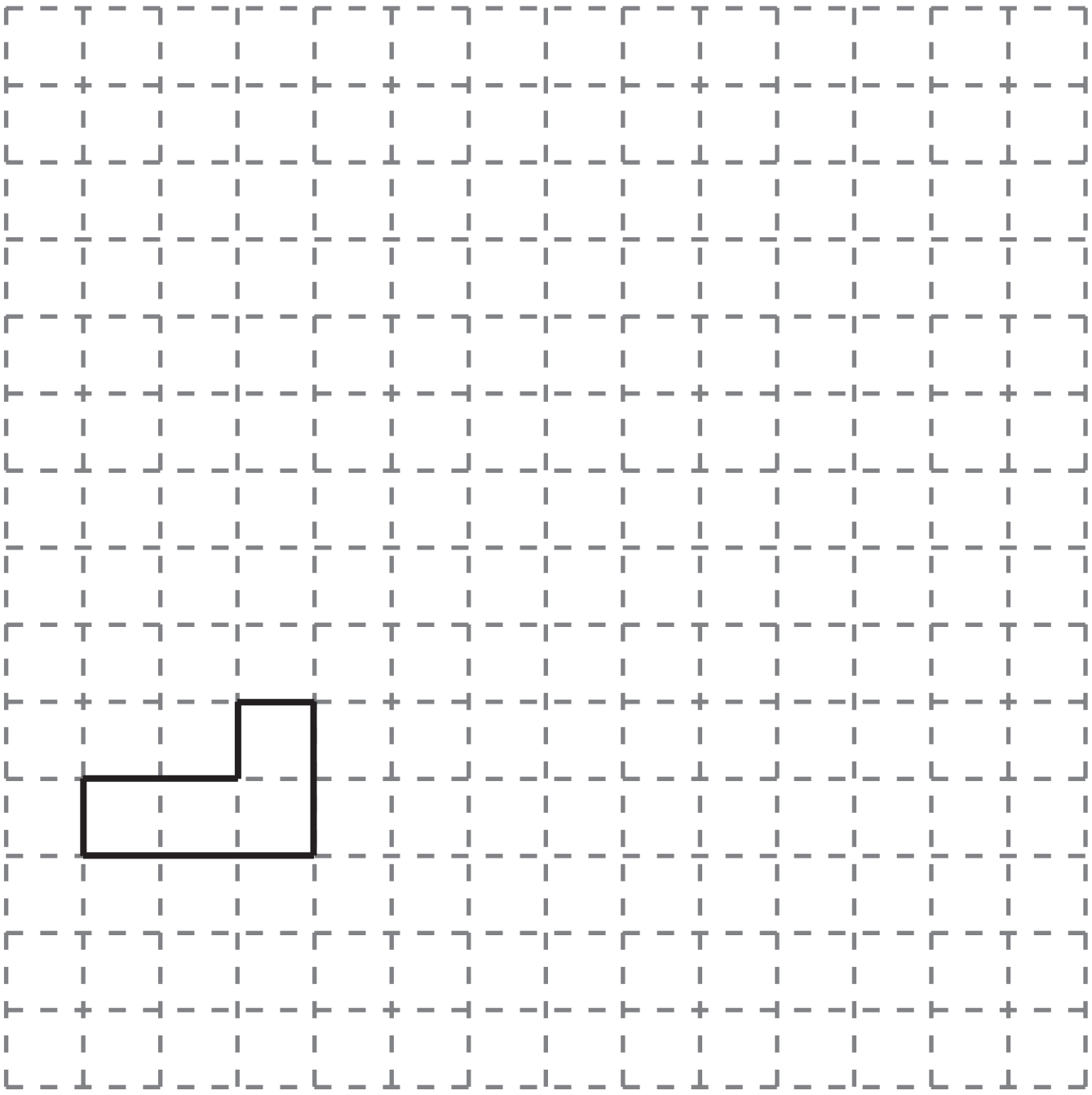
Area of triangle $= \frac{1}{2}ab\sin C$

1 In a choir there are 36 female and 24 male singers.

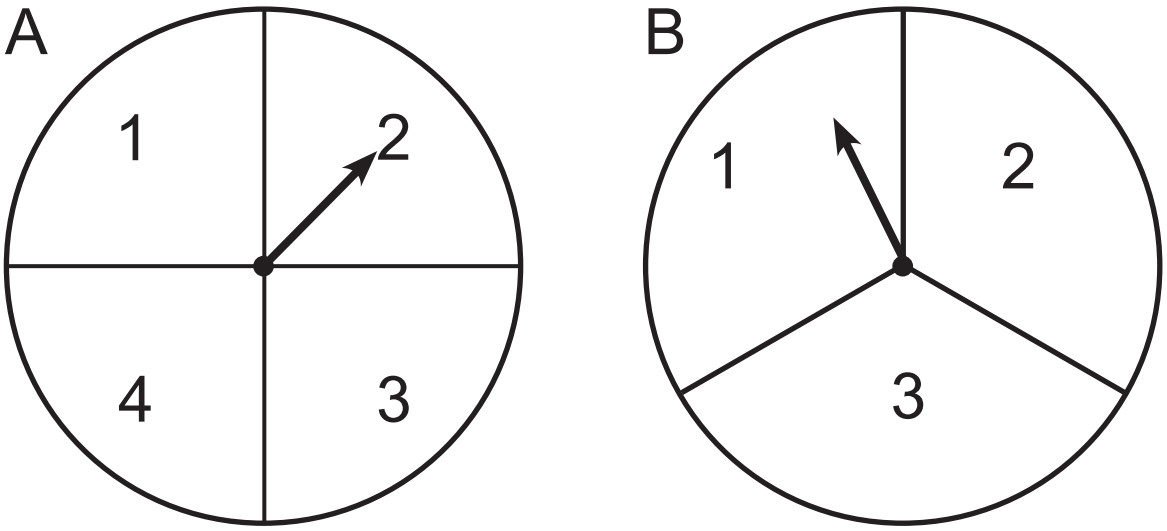
Write down the ratio of female to male singers in its simplest form. [2 marks]

Answer _____

2 Enlarge the shape by scale factor 3
[2 marks]



3



Spinners A and B are each spun once.

(a) Complete the table to show all the possible outcomes. [1 mark]

Spinner A \ Spinner B	**1**	**2**	**3**
1	1, 1	1, 2	1, 3
2	2, 1	2, 2	
3	3, 1		
4			

(b) What is the probability of getting the same number on each spinner?
[1 mark]

Answer _____

(c) What is the probability of getting a bigger number on A than B? [1 mark]

Answer _____

4 There are 32 pupils in a class and all were present on Monday.

On Monday the teacher asked each pupil their favourite colour.

She recorded the results for green, blue and yellow accurately in a table.

	Green	**Blue**	**Yellow**	**Total**
Girls	3	5	4	12
Boys	4	7	2	13
Total	7	12	6	25

(a) Give a reason why the total number of boys and girls in the table is not 32
[1 mark]

(b) There are 18 girls in the class.

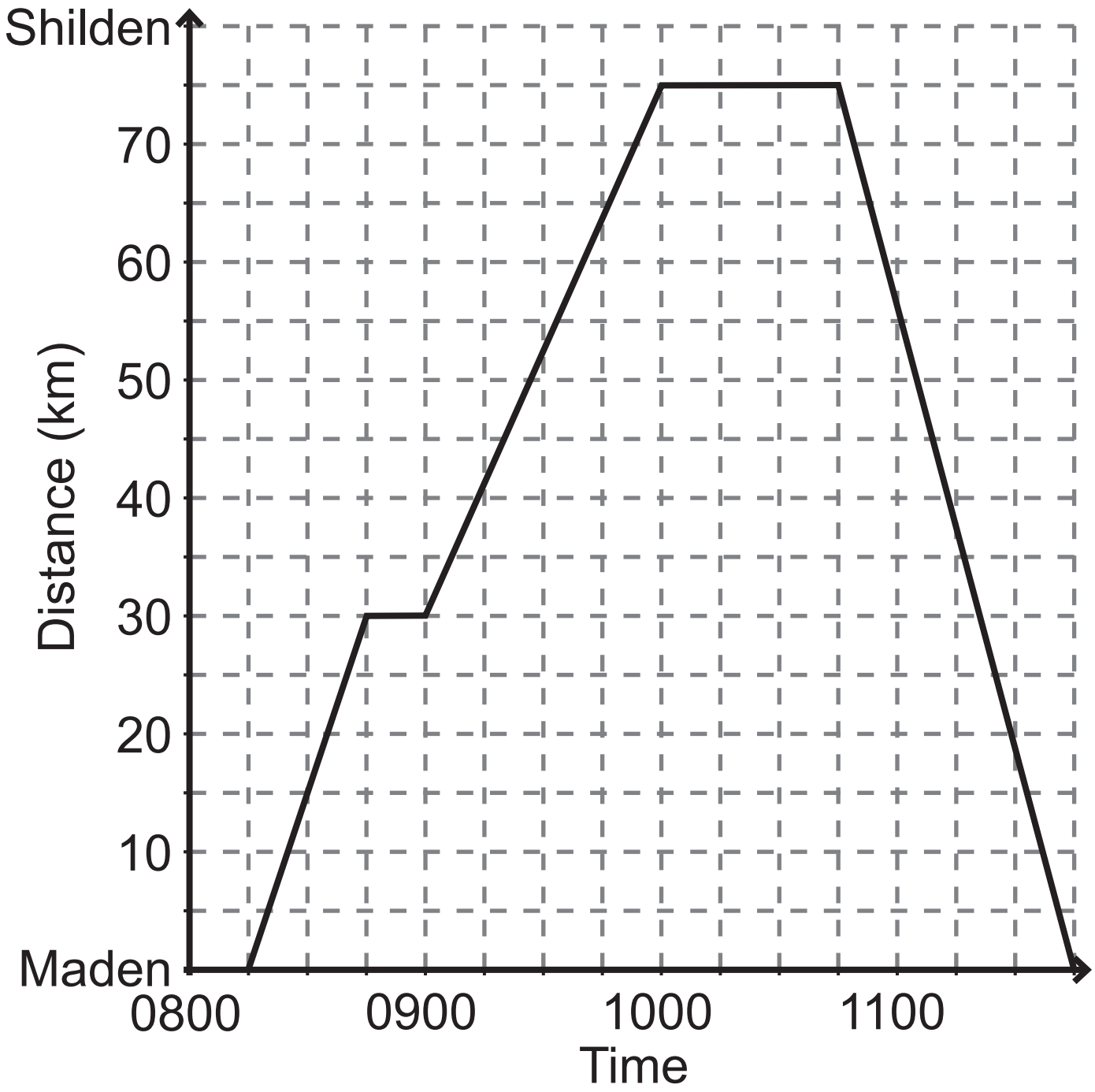
What is the probability that a girl said the colour blue? [1 mark]

Answer _____

(c) What is the probability that a pupil in the class **did not** say green? [1 mark]

Answer _____

5 The graph shows Ryan's journey from Maden to Shilden and back to Maden.



(a) How far is Ryan from Maden at 0930? [1 mark]

Answer _____ km

(b) Calculate the average speed for the whole journey. [2 marks]

Answer _____ km/h

6

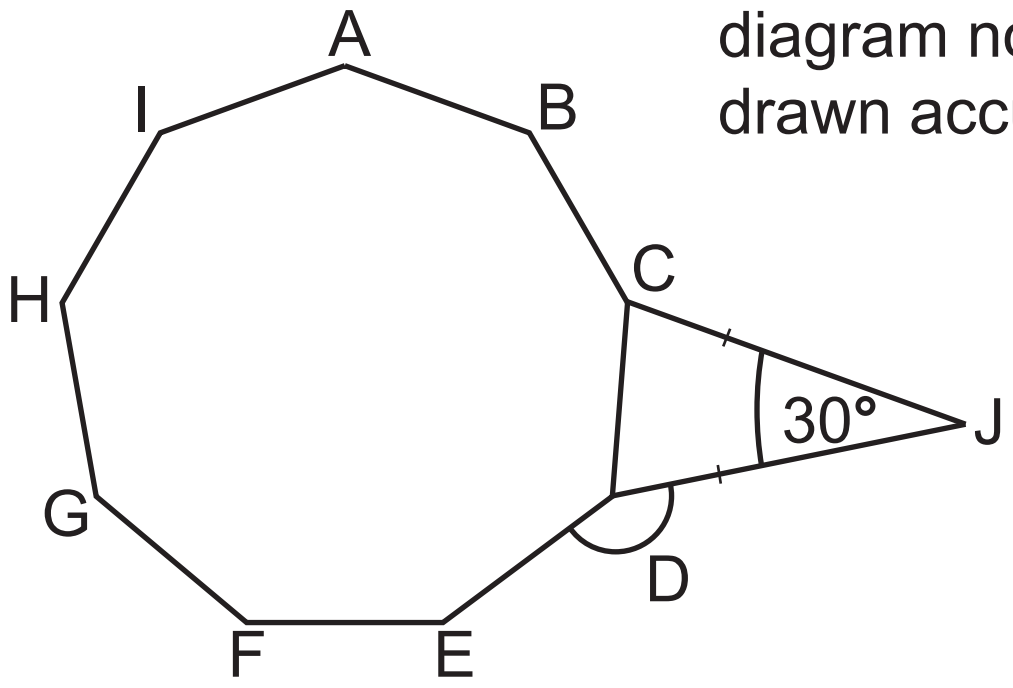


diagram not drawn accurately

The diagram shows a regular nonagon ABCDEFGHI with an isosceles triangle DCJ attached.

The angle DJC = 30°

Calculate the size of the angle EDJ.
[4 marks]

Show your working clearly.

Answer _____ °

7 Sue bought 100 ml of suncream for £5.40 in Belfast.

While in Spain she bought 150 ml of suncream for 8.80 euro.

The exchange rate was £1 = 1.07 euro.

Was it better value in Belfast or in Spain?
[5 marks]

Show your working.

Answer _____

8 There are four possible results from a music examination.

Result	Fail	Pass	Credit	Distinction
Probability		$\frac{1}{2}$	$\frac{3}{10}$	$\frac{1}{20}$

The probabilities of some results are recorded in the table.

(a) What is the probability of fail?
[2 marks]

Answer _____

(b) What is the probability of credit or distinction? [2 marks]

Answer _____

9 Simplify $\dfrac{m^5 \times m^3}{m^2}$ [1 mark]

Answer _____

10 Work out the n^{th} term of the sequence

6, 3, 0, −3, ... [2 marks]

Answer _____

11

ABCD is a rectangle, with AB = 9 cm and BC = 7 cm.

Shade the region inside the rectangle which is the locus of all points that are

(i) greater than 4.5 cm from C

and

(ii) nearer to B than D. [3 marks]

12 Use trial and improvement to solve the equation $x^3 - 3x = 11$

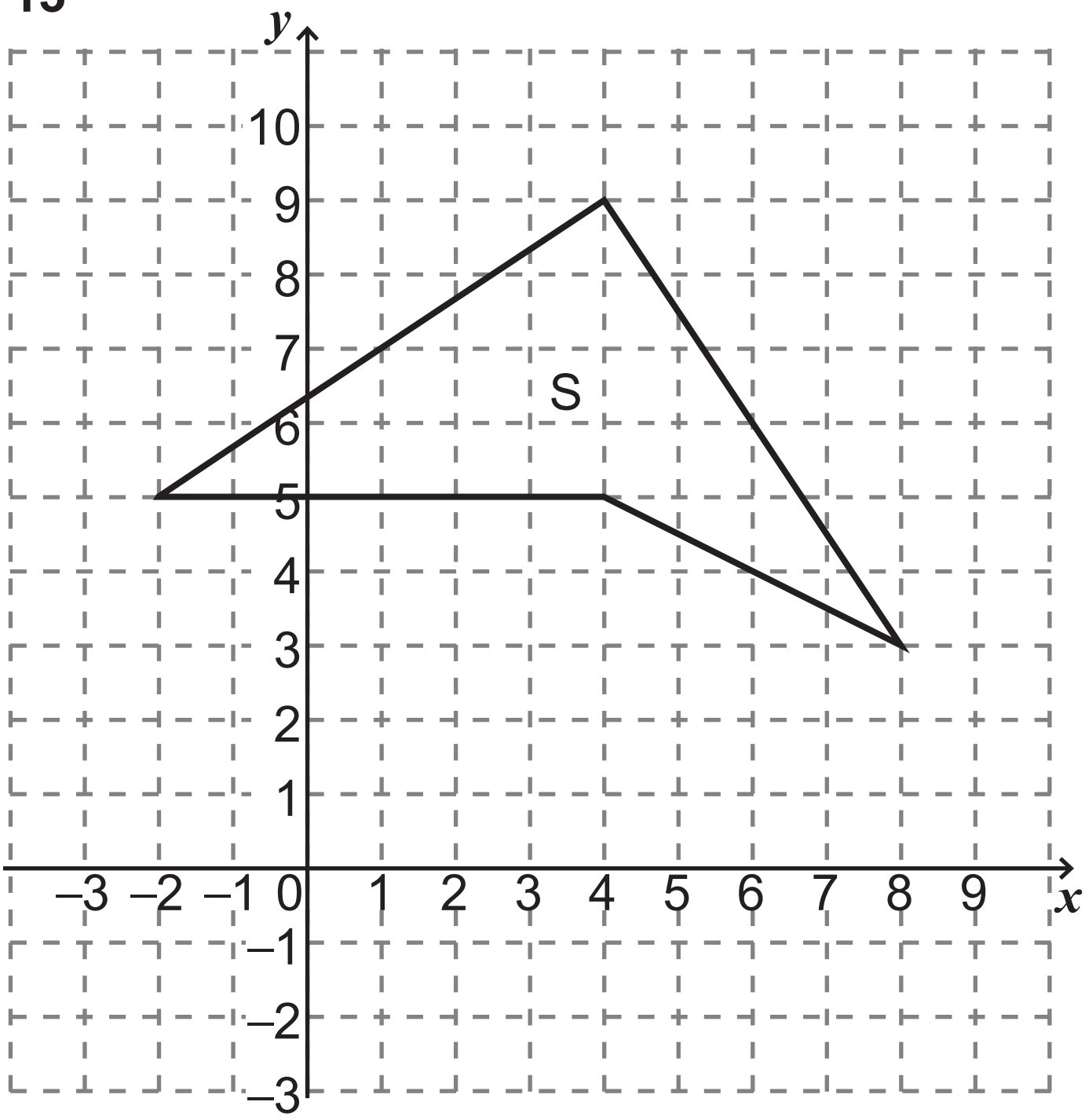
Give your answer correct to one decimal place. [4 marks]

You must show your working

x	$x^3 - 3x$	

Answer _____

13



(a) On the grid above, draw an enlargement of the shape S, using a scale factor of $\frac{1}{2}$ and centre (0, –1). [3 marks]

(b) If the shape S has an area of 20 cm^2, what is the area of the enlarged shape? [1 mark]

Answer _____ cm^2

14 s is directly proportional to the square of v.

When $v = 20$, $s = 250$

Express s in terms of v. [3 marks]

Answer _____

15 A bag contains 60 coins.

Each coin in the bag is either a 20p coin or a 50p coin.

The total value of the coins in the bag is £22.80

Work out how many of each coin is in the bag. [5 marks]

A solution by trial and improvement will not be accepted.

Answer _____ 20p coins

_____ 50p coins

16 Make T the subject of $J = \sqrt{TR}$

[2 marks]

Answer _____

This is the end of the question paper

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
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7	
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10	
11	
12	
13	
14	
15	
16	
Total Marks	

Examiner Number