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OCR
Oxford Cambridge and RSA

GCSE (9–1)

Examiners' report

MATHEMATICS

J560

For first teaching in 2015

J560/01 November 2024 series

Version 1

ocr.org.uk/maths

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions, highlight good performance and where performance could be improved. A selection of candidate responses is also provided. The reports will also explain aspects that caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

Paper 1 series overview

This calculator paper is the first of three papers taken by Foundation tier candidates for J560 GCSE (9-1) Mathematics.

Candidates should be encouraged to attempt all questions.

In general, this series, number work was well handled, while algebraic work proved more of a challenge.

Candidates should be encouraged to use a calculator. Too many candidates used non-calculator methods for finding percentages and division in particular, where trials and repeated addition were frequently seen.

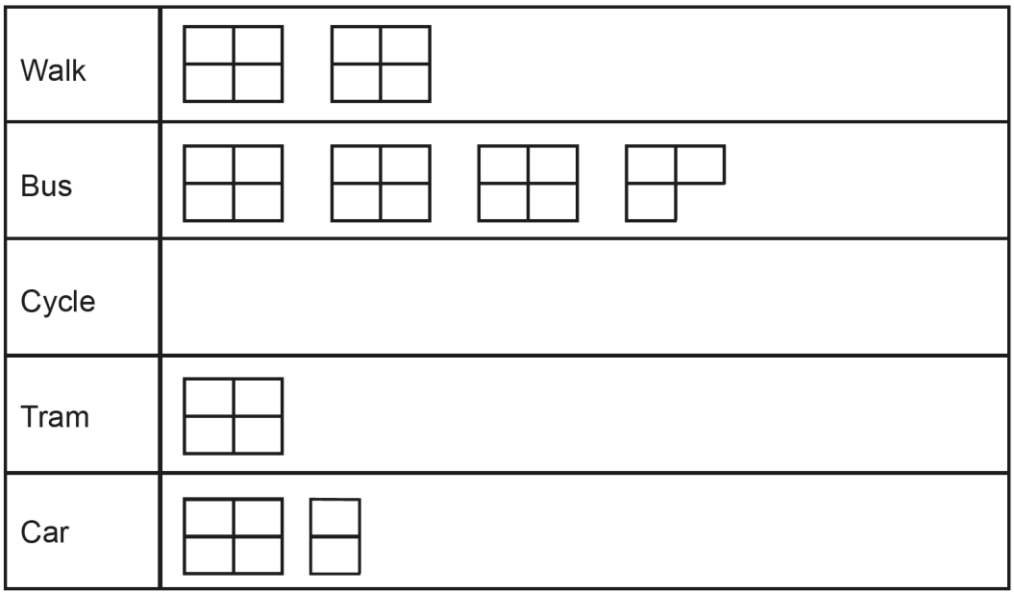
Presentation continues to be a problem for some candidates. Some candidates frequently presented work that was illogical and difficult to follow, which can be a particular issue in question requiring methods. Candidates should make sure their work is presented in a clear and concise way.

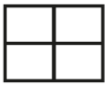
There was no evidence to suggest that lack of time was a factor for even the less successful candidates.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• attempted all questions • read questions carefully and followed instructions • provided working in 'show your working' questions • showed all the stages in their working in questions worth more than 2 marks • used and understood correct mathematical language such as 'prime numbers', 'significant figures' or 'plan view' • checked their working and made alterations where necessary • demonstrated some knowledge of algebraic techniques and ability to make time conversions • interpreted most diagrams and graphs correctly (statistical, distance/time, geometric) • demonstrated good calculator skills.	• did not read questions carefully • did not check work or consider whether an answer made sense in context • did not understand or use correct mathematical language such as angle terminology and properties, or 'common multiple' • did not always use a calculator (instead, inefficient non-calculator methods were used, often leading to arithmetic errors) • showed little or no working • presented more than one attempt at a question • provided unclear working • rounded values too soon, leading to a lack of accuracy in final answers.

Question 1 (a)

1 200 students at a school were asked how they travel to school.
The pictogram shows the results for four of the ways they travel to school.



Key:  represents 20 students.

(a) How many students walk to school?

(a) ..... **[1]**

Most candidates gave the correct answer.

Question 1 (b)

(b) How many **more** students travel by car to school than travel by tram to school?

(b) ..... **[2]**

Most candidates gave the correct answer. A small number just gave the number that travelled by car.

Question 1 (c)

(c) The rest of the 200 students cycle to school.

Complete the pictogram to show the number of students who cycle to school. **[3]**

Many were able to show the correct number 35 on the pictogram. Those who did not gain full marks often scored M1 for a correct interpretation of the diagram by placing 40, 75, 20 and 30 in the correct rows.

Question 1 (d)

(d) The total number of students at the school is 800.

What fraction of the students at the school were asked how they travel to school?
Give your answer in its simplest form.

(d) ..... **[2]**

Many correct answers were seen. Several scored 1 mark for not giving their answer in its simplest form.

Question 2 (a) (i)

2 (a) (i) Write down an odd number.

(a)(i) ..... **[1]**

Most candidates gave the correct answer.

Question 2 (a) (ii)

(ii) Write down a common multiple of 3 and 17.

(ii) ..... **[1]**

Most candidates gave a correct answer, with 51 and 102 being the most common. Some confused factors and multiples. The most common incorrect answer was 1.

Question 2 (b)

(b) Write 24 : 60 as a ratio in its simplest form.

(b) ..... : ..... **[2]**

Many correct answers were seen. The most common error was to stop cancelling at 6 : 15, perhaps because 15 is not divisible by 2.

Misconception

A common misconception is that numbers cannot be cancelled by factors other than 2.

Exemplar 1

12 : 30
6 : 15

(b) 6 : 15 [2]

This response gained 1 mark.

Question 3

3 Complete this table of fractions, decimals and percentages.

Fraction		Decimal		Percentage
$\frac{1}{5}$	=	0.2	=	
	=	0.03	=	3%
$\frac{145}{100}$	=	1.45	=	

[3]

Many candidates scored all 3 marks, with several others gaining 2. The common errors were $\frac{3}{10}$ in the second row and either 14.5% or 1.45% in the third row.

Question 4

4 Write the following numbers in order of size, smallest first.

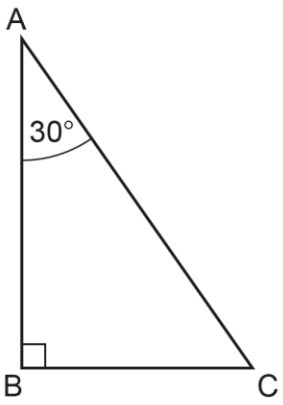
0.329 0.34 0.3041 0.346

..... , ... , ... , ... **[2]**
smallest

Many candidates were able to pick up full marks, while others achieved 1 mark. Candidates were more successful when they added extra 0s, to give the same number of digits after the decimal point.

Question 5 (a) (i)

5 **(a)** The diagram shows a triangle, ABC.
The angle at A is 30°.



Not to scale

(i) What does the symbol at angle B mean?
Choose from this list.

An acute angle	The biggest angle	An obtuse angle	A reflex angle	A right angle

(a)(i) ..... **[1]**

Many correct answers were seen. The most common incorrect answer was 'An acute angle', possibly from looking at 30° and not B.

Question 5 (a) (ii)

(ii) Work out the angle at C.
Give a geometrical reason for your answer.

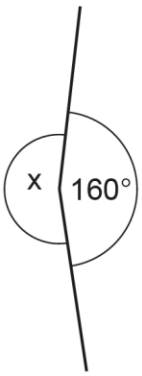
The angle at C is .....° because .....

..... **[2]**

Most were able to calculate the missing angle of 60° here but giving a reason for their answer was more challenging. Some didn't refer to 'triangle' and just stated things such as 'it adds to 180', while others did not give a geometrical justification.

Question 5 (b)

(b) A student works out the size of angle *x* in this diagram.



Not to scale

The student says the angle is 240°.

Explain why the student's answer cannot be correct.

..... **[1]**

Many candidates gained this mark. Some just stated 'angles round a point add to 360' without reference to 160° or any further explanation, which was insufficient for the mark.

Question 6

6 The circumference of a circle is 17cm.

Calculate the diameter of the circle.
Give your answer correct to **1** decimal place.

..... cm **[3]**

Many candidates did not know how to answer this question. A common incorrect method was to multiply 17 by π, while others divided 17 by 2.

Assessment for learning

Candidates should consider the reasonableness of their answer. This may have helped some realise the diameter of a circle cannot be larger than its circumference.

Question 7

7 Sketch the graph of $y = 4$ on the axes below.
Show clearly the value of any intercepts.

[2]

Few candidates scored full marks here, but there were a significant number who scored 1 mark for knowing a horizontal line was required. Several did not mark their *y*-axis intercept as 4. Some drew the line $x = 4$.

Question 8 (a)

8 **(a)** Insert **two** of these symbols $+$, $-$, $\times$ or $\div$ to make this calculation correct.

$$5 \ldots\ldots (3 \ldots\ldots 1) = 20$$

[1]

Almost all candidates scored this mark.

Question 8 (b)

(b) Calculate

$$\sqrt{\frac{12.9^2 + 83}{5^2}}$$

Give your answer correct to **3** significant figures.

..... **[3]**

Few scored full marks here, though many scored B2 for 3.159 or 3.158. Many gave their answer to three decimal places rather than three significant figures.

Question 9 (a)

9 Here is a list of five numbers.

14 2 26 43 9

(a) Find the range.

(a) ..... **[2]**

Many candidates gave the correct answer, though with little evidence of method. Those who did not give the correct answer often chose the wrong values and 14 was a common error. A small number confused range with mean or median.

Question 9 (b)

(b) A sixth number is added to the list.
The mean of the **six** numbers is 23.5.

Work out the sixth number.

(b) ..... **[3]**

There were many correct attempts at this question, although a sizeable number of candidates did not get beyond 1 mark for finding the total of the original five numbers (or often the mean of the five numbers), not realising the key to solving the problem was that the mean of all six numbers must equal 6 × 23.5.

Question 10

10 Simplify.

$8j + 4k - 10j + 7k$

..... **[2]**

Although many managed to score 2 marks here, there was also a lot of confusion over which terms to add and which to subtract (as shown in the exemplar below) with 18*j* and 3*k* seen often. Many candidates struggled to deal with -2*j*, with the most common response being 2*j* + 11*k* (which scored 1 mark for 11*k*).

Exemplar 2

$8j + 4k - 10j + 7k$ 8j +10j 4k +7k

18j - 11k

8j -11k ..... **[2]**

This response has both coefficients incorrect and did not gain any marks.

Question 11

11 A recipe for cookies uses only butter, flour and sugar in the ratio 2 : 4 : 1.
Using this recipe, 160 g of butter is needed to make 10 cookies.

Using this recipe, work out how much **flour** is needed to make 25 cookies.

..... g **[3]**

More able candidates answered this question well and achieved full marks, usually by setting out their response in three-part ratio form for butter, flour and sugar (often in columns). Another successful approach was to work out the amount of flour needed for 10 cookies, then 20 and 5 cookies before finally adding the appropriate amounts to find the correct total. Less successful responses often involved use of the total number of parts (i.e. 7).

Question 12

12 The deposit for a holiday is $\frac{2}{7}$ of the total cost.

A customer pays a deposit of £618.

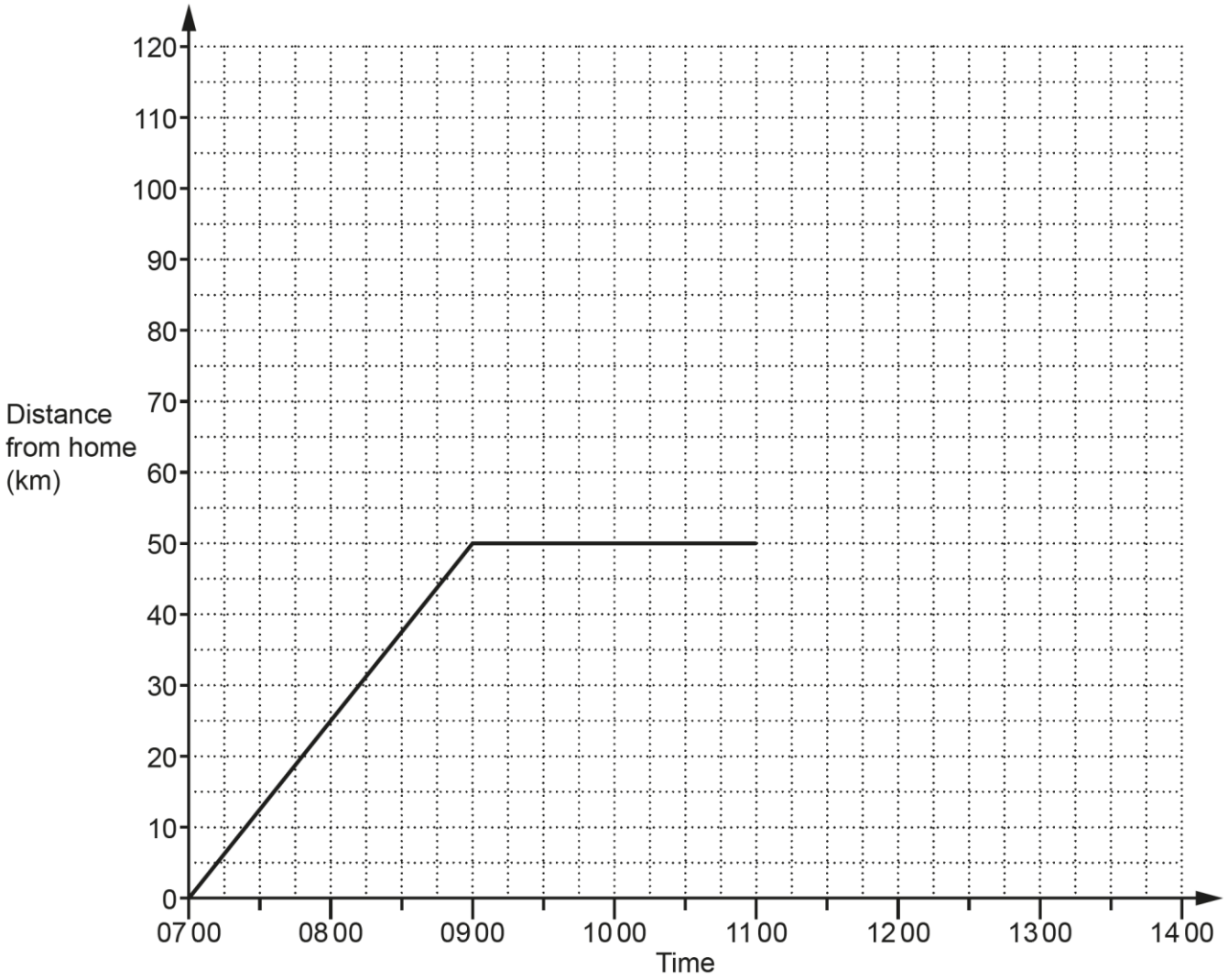
Calculate the total cost of the holiday.

£ ..... **[3]**

Many candidates were able to produce a response with clear steps to achieve the answer. The most common error was to find $\frac{2}{7}$ of £618.

Question 13 (a)

13 Zayn drives from home to a shopping centre.
The graph shows information about the journey and the time spent at the shopping centre.



(a) State an assumption that has been made when the graph was drawn.

.....

..... **[1]**

Few candidates provided the correct answer to what is a relatively common question relating to the interpretation of distance-time graphs. Many gave a fact such as arrival time or time spent at the shopping centre.

Question 13 (b)

(b) Write down the distance from Zayn's home to the shopping centre.

(b) ..... km **[1]**

Most candidates gave the correct answer of 50.

Question 13 (c)

(c) Calculate Zayn's average speed, in km/h, from home to the shopping centre.

(c) ..... km/h **[2]**

Many candidates did not apply the formula for speed correctly. Some calculated 50 × 2 rather than dividing.

Question 13 (d)

(d) Zayn leaves the shopping centre at 11 00.
Zayn drives home without stopping.
The journey home takes $1\frac{3}{4}$ hours.

Complete the graph to show this information. **[2]**

Many candidates completed the graph correctly. Some did not correctly convert $1\frac{3}{4}$ hours to work out the time of arrival.

Question 14

14 Five adults and two children go to a theme park.
The cost of an adult ticket is £6 more than the cost of a child ticket.
The total cost of the seven tickets is £142.

Work out the cost of an adult ticket.
You must show your working.

£ ..... **[5]**

Only the more able candidates started with algebra and followed it through to a correct conclusion. Many used trials instead. If candidates use trials, they should be encouraged to set them out in an ordered manner; many responded to this question with a page filled with assorted calculations and it was not always possible to link the input with the output.

Question 15

15 The cost of sending a child to nursery is £5.80 per hour on each weekday.
On Saturday the cost is $1\frac{1}{4}$ times the weekday hourly rate.

A child goes to nursery for:

- 6 hours on Wednesday
- 5 hours on Thursday
- 4 hours on Saturday.

The **total cost** for the three days is reduced by 5% as a special offer.

Work out the cost for the three days after the 5% reduction.
You must show your working,

£ ..... **[6]**

Many candidates set out their work neatly in a logical order and well labelled, usually leading to at least 3 marks (M1, M2) or (M1, M0, M2). Saturday's cost proved to be the most difficult, as dealing with $1\frac{1}{4}$ was problematic for some. Many were able to correctly calculate the percentage reduction; however, some continue to use non-calculator methods for percentage calculations, often leading to errors. Most candidates who attempted this question gained 1 mark (usually for calculating the cost for Wednesday and Thursday).

Exemplar 3

15 The cost of sending a child to nursery is £5.80 per hour on each weekday.
On Saturday the cost is $1\frac{1}{4}$ times the weekday hourly rate.

A child goes to nursery for:

- 6 hours on Wednesday
- 5 hours on Thursday
- 4 hours on Saturday.

The **total cost** for the three days is reduced by 5% as a special offer.

Work out the cost for the three days after the 5% reduction.
You must show your working.

wednesday = 5.80 x 6 = £34.80 = total

Thursday = 5.80 x 5 = £29.00 = total

$1\frac{1}{4}$ of 5.80 = 7.25

saturday = 7.25 x 4 = £29.00

34.80
+ 29.00
29.00
= £92.80

£ 92.80 [6]

This candidate gained 3 marks for their response. They have correctly calculated and totalled the costs for the three days but have not reduced the total cost by 5%.

Question 16

16 Leo pays £44.98 for 26 litres of diesel.
Mia puts 60 litres of the same diesel into her car.
Mia has £103 with which to pay for her diesel.

Does Mia have enough money to pay for her diesel?
Show how you decide.

..... because .....

..... **[4]**

Many scored 4 marks, usually for 'No' and 103.8. It was rare to see 60 ÷ 26. Some scored M1 for 1.73 but could not make further progress. Only a small number who had calculated 103.8 gave the response 'Yes'.

Question 17 (a)

17 Factorise fully.

(a) $6x^2 + 9x$

(a) ..... **[2]**

More able candidates gave the correct answer. A small number gained 1 mark for a partial factorisation. A common error was not including brackets. A common misunderstanding was to consider this as a request to combine the terms, leading to responses such as $15x^3$ or $15x^2$.

Question 17 (b)

(b) $x^2 + 8x + 15$

(b) ..... **[2]**

Fewer candidates gained marks here than part (a), despite this being quite a straightforward factorisation without negative signs. More able candidates gave the correct answer. As with part (a), many gave answers that did not include brackets.

Question 18 (a)

18 (a) N is a number such that:

- $N = 3 \times 5 \times k$, where k is a prime number
- N is greater than 400.

Find the smallest possible value of N.

(a) $N =$ ..... **[3]**

Many candidates knew the term 'prime number' and used 29 to reach the correct answer 435. Using 27 was the most common error.

Question 18 (b)

(b) a and b are different prime numbers.

Explain why $a \times b$ is not a prime number.

.....

..... **[1]**

Candidates found this question challenging. Many just explained what a prime was, rather than commenting that $a \times b$ would have more factors than 1 and the total itself.

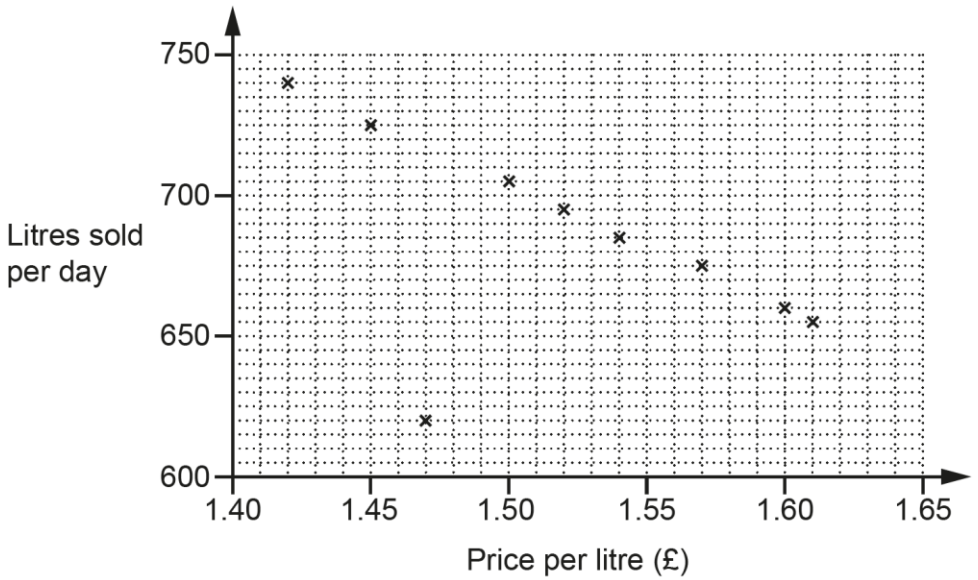
Question 19 (a)

19 Each week the manager of a petrol station records the average daily sales, in litres, and the average price, in pounds, of a litre of petrol for that week.

The table shows their results for ten weeks.

Week	1	2	3	4	5	6	7	8	9	10
Price per litre (£)	1.42	1.45	1.47	1.50	1.54	1.60	1.57	1.52	1.61	1.46
Litres sold per day	740	725	620	705	685	660	675	695	655	715

The results for the first nine weeks are plotted on the scatter diagram.



(a) Plot the result for week 10. **[1]**

Many candidates were able to correctly plot the point.

Question 19 (b)

(b) Describe the type of correlation shown in the scatter diagram.

(b) ..... **[1]**

Although several gave the correct answer, many used an incorrect term such as 'descending' or 'downhill'. Some stated positive.

Question 19 (c)

(c) In one week, there was a delay with petrol deliveries.

Circle the most likely point on the scatter diagram for that week. **[1]**

This was generally well answered, though some circled an incorrect point, and several did not attempt the question.

Question 19 (d) (i)

(d) (i) On the scatter diagram, draw a line of best fit. **[1]**

Many drew a correct line. Common errors were a line with negative gradient not within the given boundaries or a line with positive gradient, while some just joined the points.

Question 19 (d) (ii)

(ii) Use the line of best fit to estimate the average daily sales when the price per litre of petrol is £1.48.

(d)(ii) ..... litres **[1]**

Some were able to give the correct reading from their line. Others identified the correct position on their line but misread the scale.

Question 19 (e)

(e) The manager says,

As the sales go down, the total amount of money we take stays roughly the same.

Find evidence to support this statement.

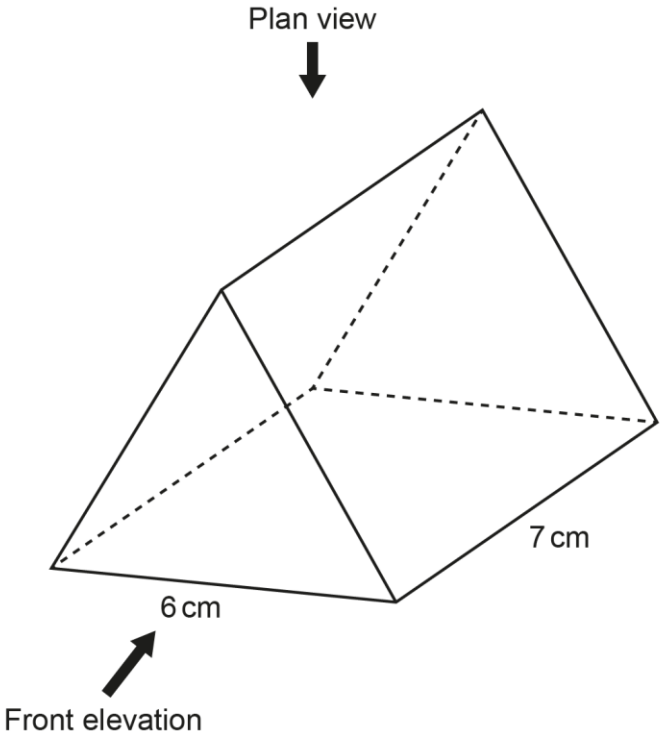
.....

..... **[3]**

Few candidates gained 3 marks. The majority chose a price per litre and the number of litres sold but did not calculate the total cost.

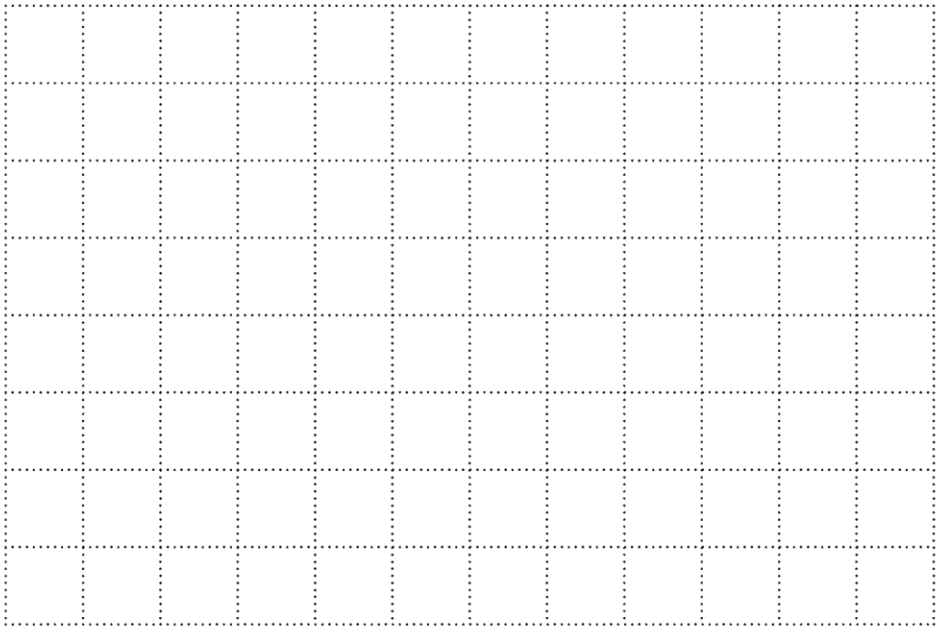
Question 20 (a)

20 The diagram shows an equilateral triangular prism.
Each side of the equilateral triangle is 6 cm and the length of the prism is 7 cm.



Not to scale

(a) Draw an accurate plan view of the prism on the one-centimetre square grid below.



[3]

Few candidates scored 3 marks here. Drawing a rectangle with a 7 by 6 outline was awarded 2 marks. Others scored 1 mark for a rectangular outline. Some confused the term 'plan view' with front elevation.

Question 20 (b)

(b) Draw an accurate front elevation of the prism on the one-centimetre isometric grid below.

[2]

Many attempted to draw a triangle, but not always an equilateral one. Some drew nets or gave 3D representations.

Question 21

21 At the start of 2020, the value of a particular caravan was £25 000.
The value of the caravan then decreased by 12% each year.

Calculate the **total loss in value** of the caravan at the end of 3 years.

£ ..... **[4]**

Few candidates gained full marks. Although the formula for compound interest was given on the formulae sheet, many did not adapt it for a reduction. Several attempted to subtract 12% per year. A significant number calculated 12% of the starting cost as 3000, but then considered this 3000 as the decrease for each year and subtracted 9000.

Question 22

22 The width, w, of a car parking space is 2.8 metres, correct to 1 decimal place.

Complete the error interval for the width, w.

..... $\leqslant w <$ ..... **[2]**

The most common answers were 2.7 and 2.8. Several wrote 2.75 and 2.84. Many candidates did not attempt this question.

Question 23

23 Force is measured in newtons (N).
A force of 140 N is applied to a surface of area 8 cm^2.

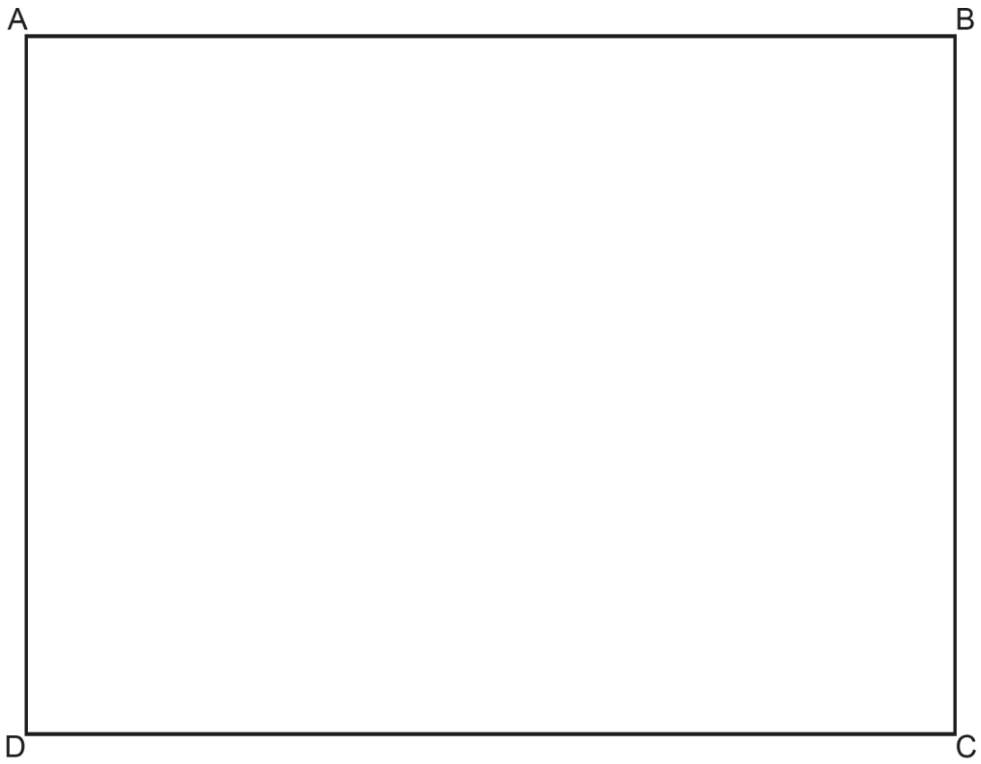
Work out the pressure, in N/cm^2, applied to this surface.

..... N/cm^2 **[2]**

Some candidates gave the correct answer, though others multiplied rather than dividing. A small number of candidates calculated $140 \div 8^2$ or 140×8^2.

Question 24

24 The diagram shows a rectangular garden ABCD.



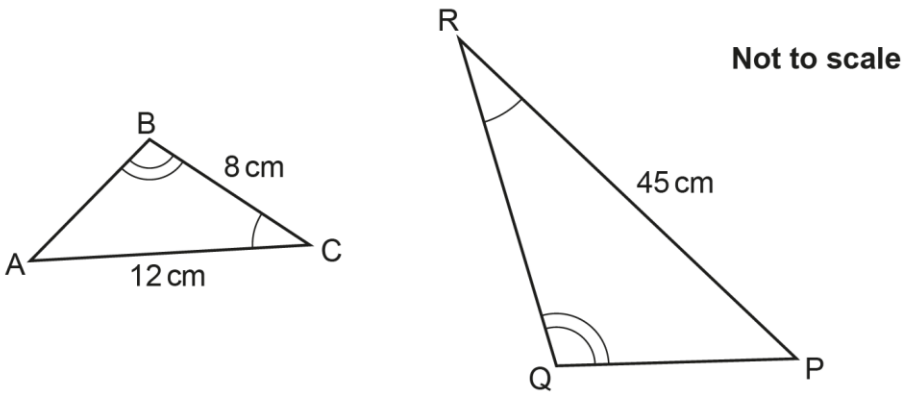
The region of the garden that is closer to DA than DC is to be made into a patio.

Construct and shade the region for the patio.
Show all your construction lines. **[3]**

Many candidates did not seem to know what was expected for this question and did not attempt it. Of those who made an attempt, many simply drew a vertical line a distance from AD.

Question 25

25 Triangles ABC and PQR are mathematically similar.
Angle ACB = Angle PRQ.
Angle ABC = Angle PQR.



The perimeter of triangle PQR is 99 cm.

PQ = ... cm **[4]**

While a very small number were able to give the correct answer, many candidates did not attempt this question. Common errors were to use Pythagoras' theorem or trigonometry. Some assumed the triangle was isosceles and calculated 99 − 45, then halved the result.

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