AQA

Video solutions: MDCK Scan Me

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

PREDICTED TOPIC PAPER

Very Likely

H

June 2025 **Paper 2 Calculator**

Materials

For this paper you must have:
- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is
- You may ask for more answer paper, grapn paper and tracing paper. These must be tagged securely to this answer book.

Advice

In all calculations, show clearly how you work out your answer.

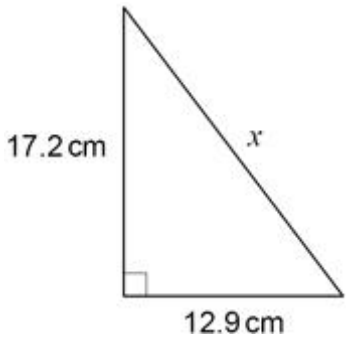
For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
TOTAL	

Answer **all** questions in the spaces provided.

Do not write outside the box

Q1.

Use Pythagoras' theorem to work out the value of x.



Not drawn accurately

x = _____ cm

(Total 3 marks)

Q2.

Harry and Ginny each bought a printer and a hard drive.

Here is some information about how much they paid.

	Printer	**Hard drive**
Harry	£80	£25
Ginny	10% less than Harry	20% more than Harry

Ginny says,

"In total, I paid more than Harry because 20% is greater than 10%"

Is she correct?

Tick a box.

Yes ☐ No ☐

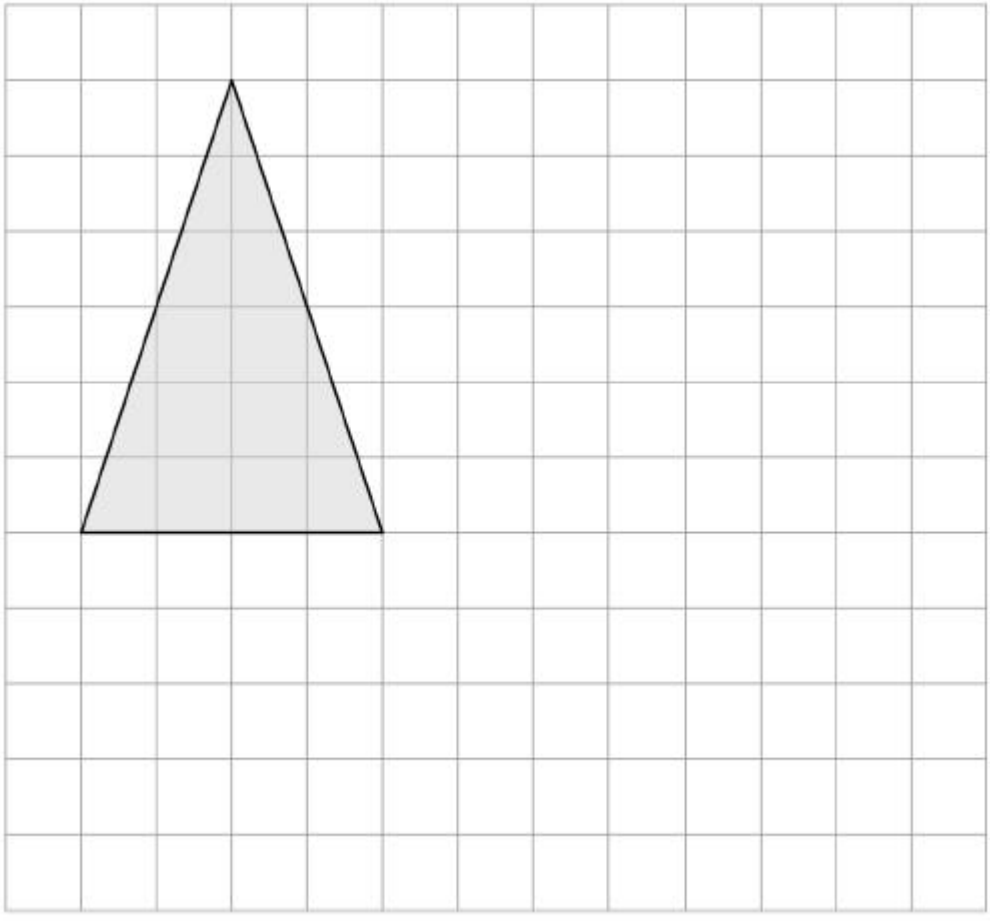
Show calculations to support your answer.

Do not write outside the box

(Total 2 marks)

Q3.

On the grid, draw an enlargement of the triangle with scale factor $\frac{1}{2}$



(Total 2 marks)

Q4.

Do not write outside the box

Hermione drove 198 miles.

Her average speed for the first 3 hours was 45 miles per hour.

Her average speed for the rest of the journey was 31.5 miles per hour.

Work out her average speed for the whole journey.

Answer _____ miles per hour

(Total 4 marks)

Q5.

Do not write outside the box

Luna's total annual pay = salary + bonus

	Salary	Bonus
Last year	£26 000	£4000
This year	6% increase	9% decrease

Work out the percentage change in her total annual pay.

State whether it is an increase or a decrease.

Answer _____

(Total 4 marks)

Q6.

Do not write outside the box

Bellatrix wants to borrow £6000 and repay it, with interest, after two years.

She sees two offers for loans.

Offer 1
Compound interest
3% per year

Offer 2
Compound interest
First year 1%
Second year 5%

Bellatrix says,

"I will pay back the same amount because the average of 1% and 5% is 3%"

Is she correct?

You **must** show your working.

(Total 3 marks)

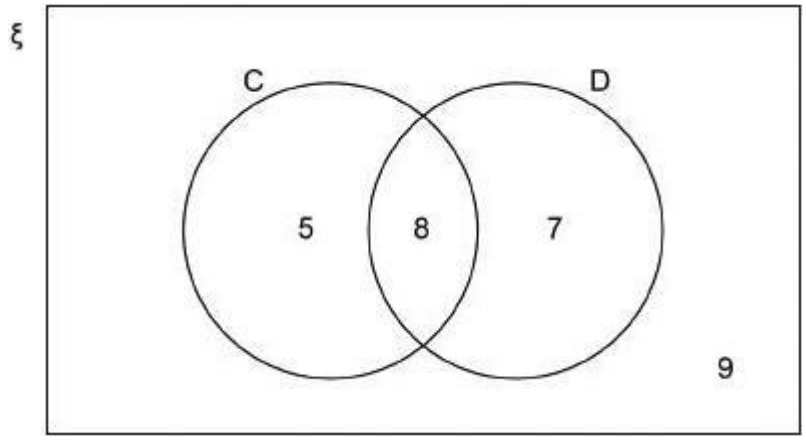
Q7.

Do not write outside the box

ξ = 29 students in a class

C = students who own a cat

D = students who own a dog



(a) A student is chosen at random.

Circle the probability that the student owns a cat or a dog but not both.

$\frac{12}{29}$ $\frac{13}{29}$ $\frac{15}{29}$ $\frac{20}{29}$

(1)

(b) A student who owns a dog is chosen at random.

Circle the probability that the student also owns a cat.

$\frac{7}{15}$ $\frac{8}{15}$ $\frac{7}{29}$ $\frac{8}{29}$

(1)

(Total 2 marks)

Do not write outside the box

Q8.

Dobby owes an amount of £600

He wants to pay back this amount in five months.

He says,

"Each month, I will pay back 20% of the amount I still owe."

Show working to check if his method is correct.

(Total 3 marks)

Q9.

The first two cube numbers are 1 and 8

Show that

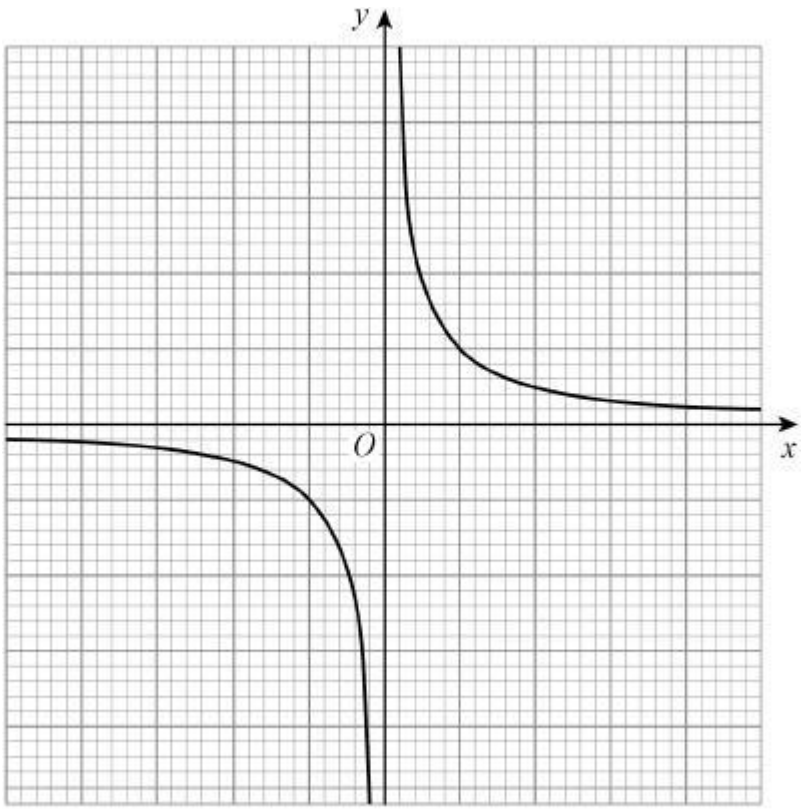
the 3rd cube number can be written as the sum of three different prime numbers.

$\square = \square + \square + \square$

(Total 3 marks)

Q10.

Here is the sketch of a graph.



Circle the equation of the graph.

$y = x$ $y = -x^2$ $y - x^3$ $y = \frac{1}{x}$

(Total 1 mark)

Do not write outside the box

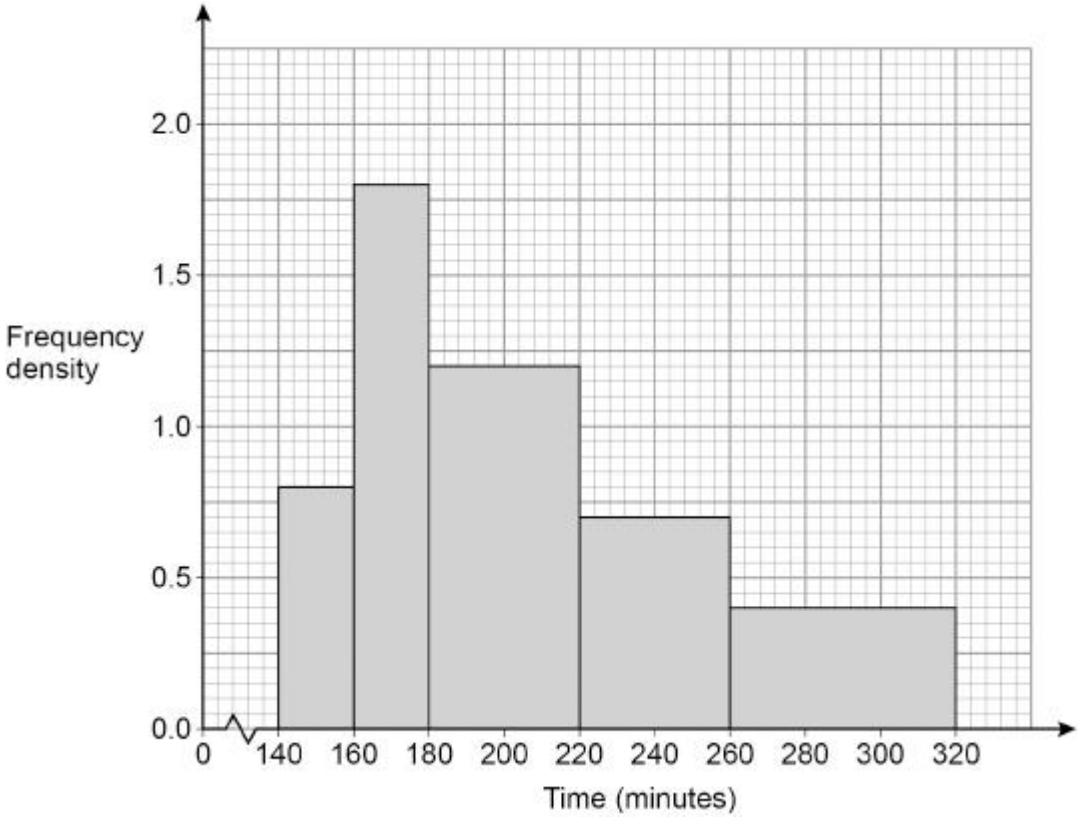
Q11.

Do not write outside the box

180 runners **started** a marathon.

Some of the runners did not complete it.

(a) The histogram represents the times of the runners who did complete the marathon.



How many runners did **not** complete the marathon?

Answer _____

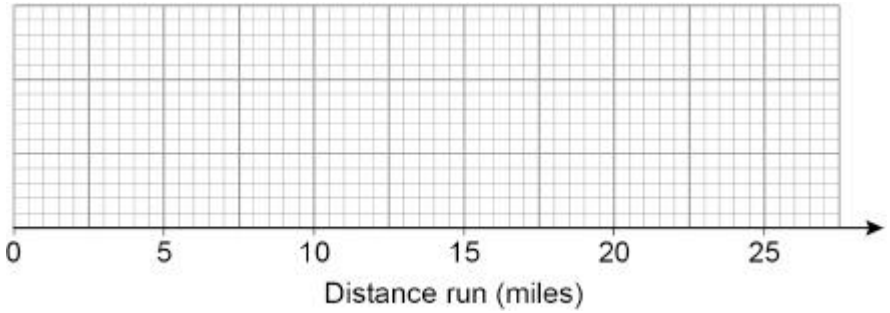
(3)

(b) The table shows information about the runners who did **not** complete the marathon.

Do not write outside the box

	Distance run (miles)
Least distance	5
Greatest distance	23
Lower quartile	11
Median	18
Interquartile range	9

Draw a box plot to represent the information.



(3)

(Total 6 marks)

Q12.

Do not write outside the box

Nevile owns a sandwich shop.

The shop is open from Monday to Saturday.

In June, Nevile sold 3000 sandwiches.

(a) Nevile wants to work out the mean number of sandwiches he sold per day in June.

His method is 3000 ÷ 30 = 100

Make **one** criticism of Nevile's method.

_____

_____

(1)

(b) Nevile received £6660 from selling the 3000 sandwiches in June.

The numbers of sandwiches sold were in the ratio

meat : cheese : vegan = 9 : 4 : 7

The price of a meat sandwich is £2.39

The price of a cheese sandwich is £1.89

Work out the price of a vegan sandwich.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer £ _____

(4)

(Total 5 marks)

Q13.

Do not write outside the box

y is inversely proportional to $\sqrt{x}$

$y = 4$ when $x = 9$

(a) Work out an equation connecting y and x.

Answer _____

(3)

(b) Work out the value of y when $x = 25$

Answer _____

(2)

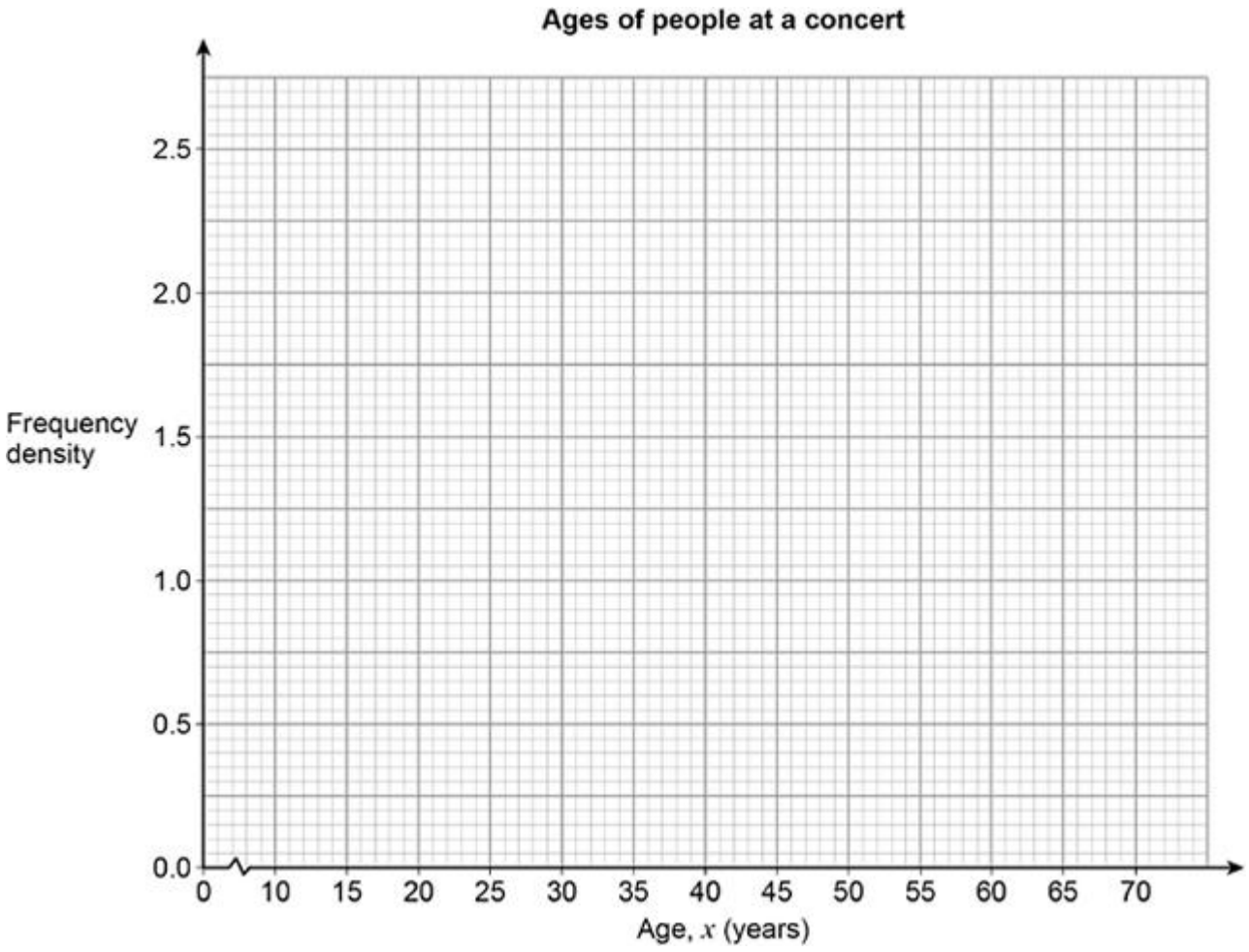
(Total 5 marks)

Q14.

Here is some information about the ages of people at a concert.

Age, x (years)	Frequency
$10 \leq x < 15$	8
$15 \leq x < 25$	24
$25 \leq x < 40$	30
$40 \leq x < 70$	39

Draw a histogram to represent the information.



(Total 3 marks)

Q15.

Do not write outside the box

The nth terms of two linear sequences, A and B, are added to give the nth term of a new sequence.

The new sequence starts

8 13 18 23

The nth term of sequence A is $n + 1$

Work out the nth term of sequence B.

Answer _____

(Total 4 marks)

Q16.

To be rented, a bedroom must have a floor area of at least 6.51 m^2

A bedroom has a rectangular floor.

The floor measures 2.4 m by 2.9 m, each correct to 2 significant figures.

Show that the bedroom can be rented.

(Total 3 marks)

Do not write outside the box

Q17.

d is directly proportional to the square of v.

d = 6 when v = 20

(a) Work out an equation connecting d and v.

Answer _____

(3)

(b) Work out the value of d when v = 30

Answer _____

(2)

(Total 5 marks)

Q18.

(7, 28) is a point on the graph $y = f(x)$

Circle the point which **must** be on the graph $y = f(x) + 2$

(7, 26) (7, 30) (5, 28) (9, 28)

(Total 1 mark)

Q19.

The length of a roll of ribbon is 30 metres, correct to the nearest half-metre.

A piece of length 5.8 metres, correct to the nearest 10 centimetres, is cut from the roll.

Work out the maximum possible length of ribbon left on the roll.

Answer _____ metres

(Total 3 marks)

Q20.

P and *Q* are points.

The x-coordinate of *Q* is 4 **more** than the x-coordinate of *P*.

The y-coordinate of *Q* is 5 **less** than the y-coordinate of *P*.

Work out the gradient of the straight line through *P* and *Q*.

Answer _____

(Total 2 marks)

Q21.

Do not write outside the box

Line A

has equation $y = ax - 1$

passes through the point (7, 13)

Line B has equation $5y - 3x = 4$

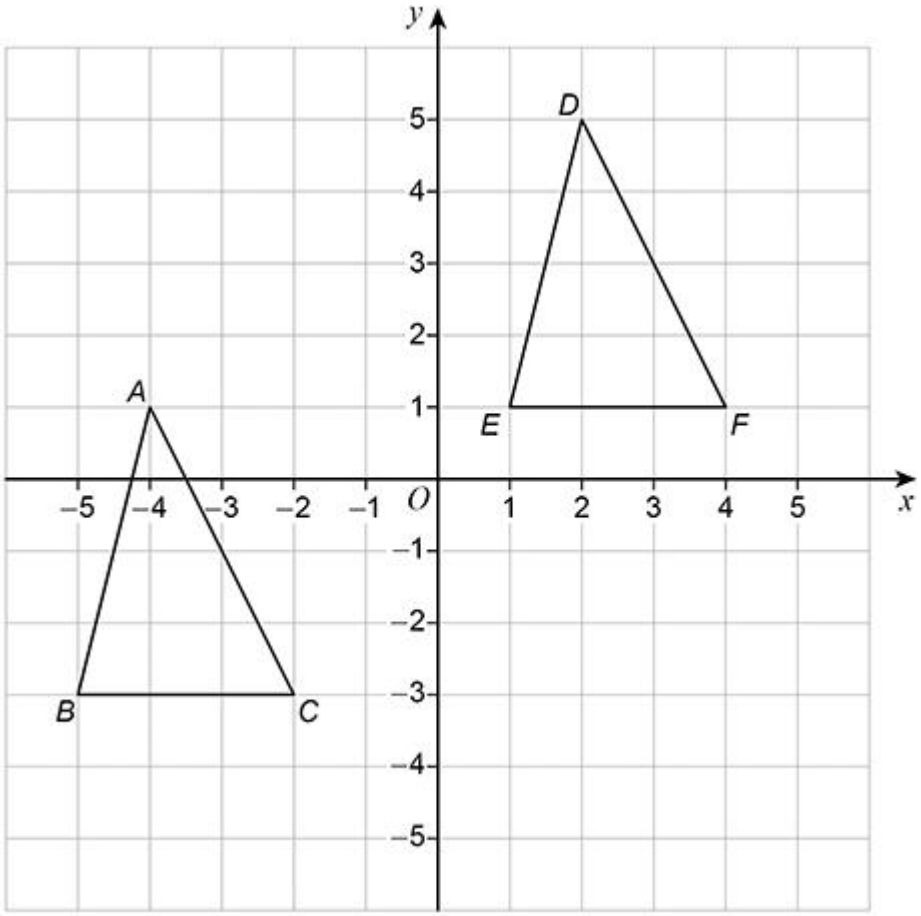
Show that line A has a greater gradient than line B.

(Total 3 marks)

Q22.

Do not write outside the box

Triangles *ABC* and *DEF* are shown on a grid.



Describe a single transformation that shows the triangles are congruent.

(Total 2 marks)

Q23.

Do not write outside the box

Outside a cafe there is a large plastic ice cream cornet. The cornet is a hemisphere on top of a cone.

The cone and the hemisphere each have radius 24 cm. The cone has perpendicular height 117 cm

Volume of a cone = $\frac{1}{3}\pi r^2 h$ r is the radius h is the perpendicular height	Volume of a hemisphere = $\frac{2}{3}\pi r^3$ r is the radius

(a) Work out the total volume of the cornet.

Answer _____ cm^3

(4)

(b) The actual cornets that the cafe sells are **similar** to the plastic one.
For the actual cornets, the cone and the hemisphere each have radius 2 cm

How many times greater is the volume of the plastic cornet than an actual cornet?

Answer _____

(3)

(Total 7 marks)

Q24.

Here are the first four terms of a quadratic sequence.

3 20 47 84

Work out an expression for the nth term of the sequence.

Answer _____

(Total 4 marks)

Do not write outside the box

Q25.

Do not write outside the box

$$m = \frac{p - 2b}{2}$$

p = 68.3 correct to 1 decimal place.

b = 8.7 correct to 1 decimal place.

Work out the lower bound for m.

Answer _____

(Total 3 marks)

Q26.

On three days, Hedwig throws darts at a target.

Here are his results.

	Number of throws	Number of hits	Number of misses
Monday	20	15	5
Tuesday	30	22	8
Wednesday	40	17	23
Total	90	54	36

(a) Work out **two** different estimates for the probability of Hedwig hitting the target.

Answer _____ and _____

(2)

(b) Which of your two answers is the better estimate for the probability of Hedwig hitting the target?

Give a reason for your answer.

Answer _____

Reason _____

_____

(1)

(Total 3 marks)

Do not write outside the box

Q27.

Minerva and Remus travel the same 16.8 km route.

Minerva starts at 9.00 am and walks at a constant speed of 6 km/h

Remus starts at 9.30 am and runs at a constant speed.

Remus overtakes Minerva at 10.20 am

At what time does Remus finish the route?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Answer _____

(Total 5 marks)

Do not write outside the box

Q28.

a is a prime number.

b is an even number.

$N = a^2 + ab$

Circle the correct statement about N.

could be even or odd	always even
always prime	always odd

(Total 1 mark)

Q29.

$f(x) = \frac{3x+9}{5}$ and $g(x) = 6x - 1$

(a) Show that gf(2) is an integer.

(2)

(b) Show that $f^{-1}(8)$ is **not** an integer.

(2)

(Total 4 marks)

Do not write outside the box

Q30.

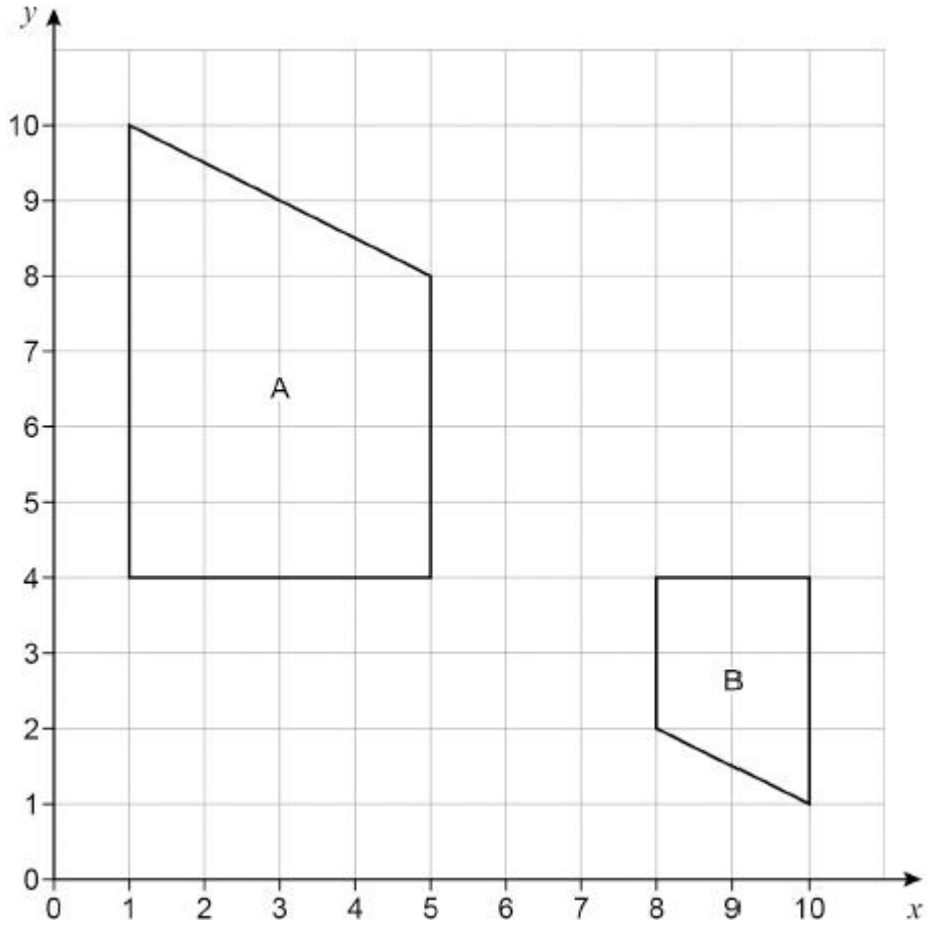
Circle the word that describes the graph $y = \sin x$

periodic exponential cubic quadratic

(Total 1 mark)

Q31.

Shape A and shape B are shown on the grid.



Describe the **single** transformation that maps shape A to shape B.

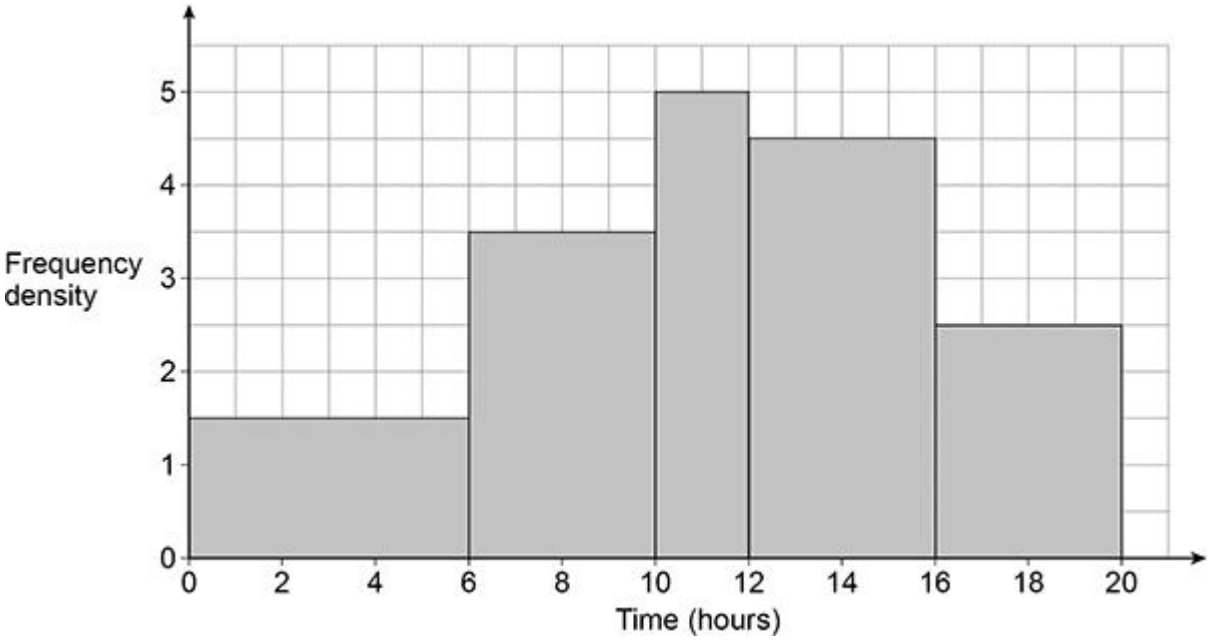
(Total 3 marks)

Q32.

Do not write outside the box

61 students recorded how many hours they spent revising for a test.

The histogram represents the results.



(a) Work out an estimate of the mean time the 61 students spent revising.

You may use the table to help you.

Time, x (hours)	Frequency	Midpoint	
$0 \leqslant x < 6$			
$6 \leqslant x < 10$			
$10 \leqslant x < 12$			
$12 \leqslant x < 16$			
$16 \leqslant x < 20$			

Answer _____ hours

(4)

(b) Give a reason why the answer to part (a) is an estimate.

Do not write outside the box

_____

_____

_____

_____

_____

(1)

(Total 5 marks)

Q33.

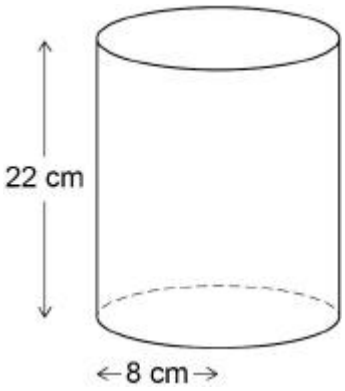
Do not write outside the box

A company makes two types of lampshade using fabric on wire frames.

Lampshade A

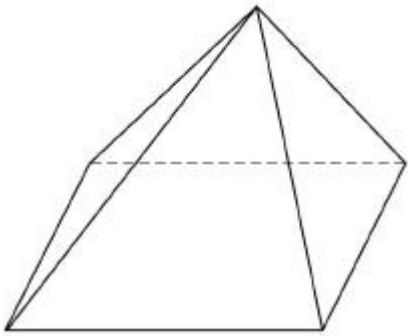
Fabric is used to make the curved surface of a cylinder.

The cylinder has radius 8 cm and height 22 cm



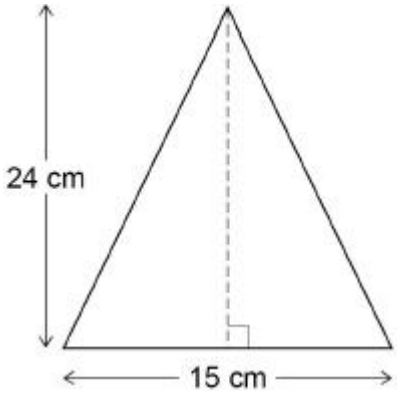
Lampshade B

Fabric is used to make the four triangular faces of a pyramid.



Each triangular face has base 15 cm and perpendicular height 24 cm

Not drawn accurately



Cost of fabric	£400 per square metre
Other costs for A	£3.50 per lampshade
Other costs for B	£7.50 per lampshade

Work out the ratio cost of one lampshade A : cost of one lampshade B

Give your answer in the form n : 1

Answer _____ : _____

(Total 5 marks)

Do not write outside the box

Q34.

A circle has centre (0, 0) and passes through (0, 11)

Write down the equation of the circle.

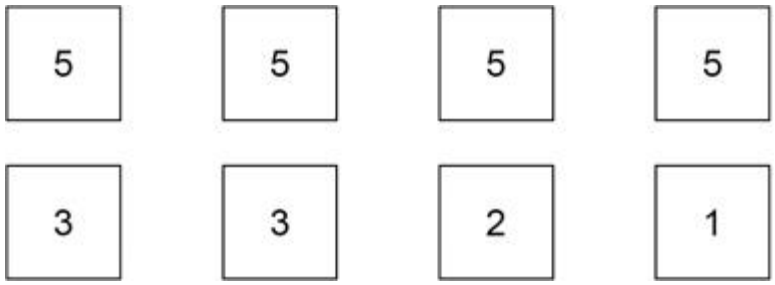
Answer _____

(Total 1 mark)

Q35.

Do not write outside the box

In a game, these numbered tiles are in a bag.



To play the game

Choose tiles at random one at a time and do not replace the tiles.

You win if at any stage the total of the numbers on your tiles is 10

Ron plays the game once.

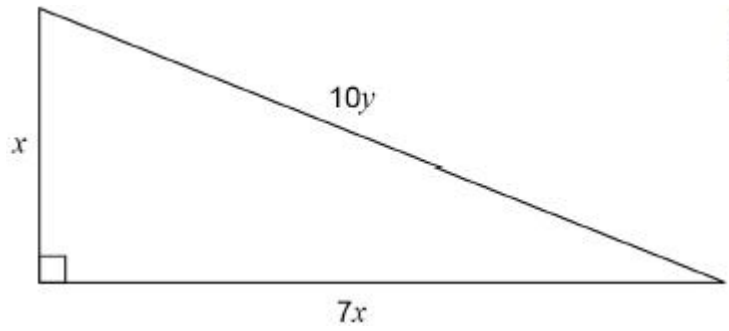
Work out the probability that he wins.

Answer _____

(Total 4 marks)

Q36.

All dimensions are in centimetres.



Not drawn accurately

Use Pythagoras' theorem to work out the exact value of $\frac{x}{y}$

Answer _____

(Total 3 marks)

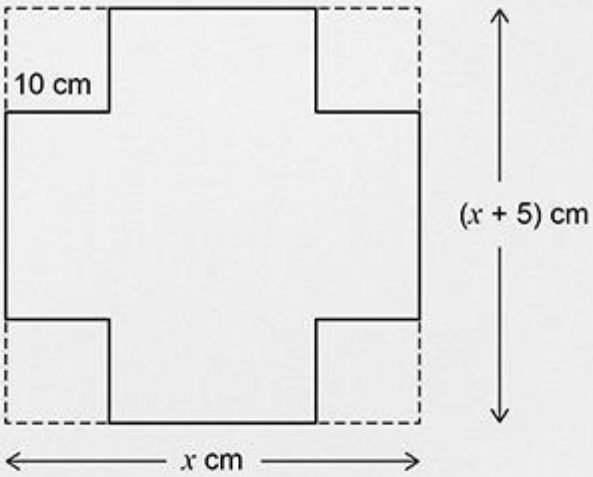
Q37.

Do not write outside the box

Lily has the following question for homework.

The net of a box is made by cutting four squares from a piece of cardboard.
The cardboard is a rectangle with width x cm and length $(x + 5)$ cm
Each square has side length 10 cm
The area of the net is 1000 cm^2
Work out the value of x.

Not drawn accurately



(a) Show that Lily can form the equation $x^2 + 5x - 1400 = 0$

(3)

(b) Lily correctly factorises the equation to get $(x + 40)(x – 35) = 0$

Her answer to the homework question is $x = –40$ or $x = 35$

Is her answer correct?

Tick a box.

☐ Yes ☐ No

Give a reason for your answer.

_____

_____

(1)

Do not write outside the box

END OF QUESTIONS

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED