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

Good Chance 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	

Do not write outside the box

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

Q1.

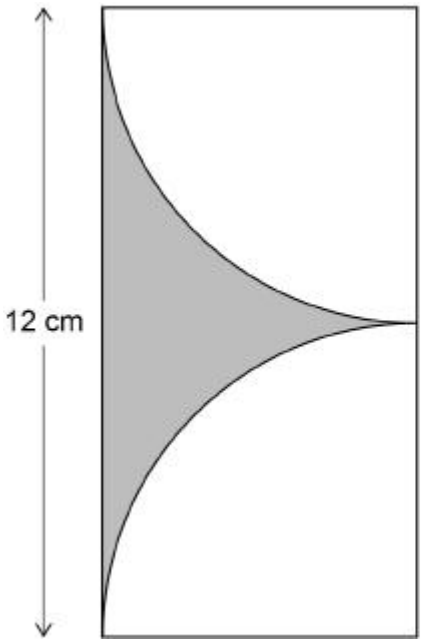
Write 30 : 12 in the form n : 1

Answer _____ : 1

(Total 1 mark)

Q2.

Two identical quarter circles are cut from a rectangle as shown.



Not drawn accurately

Work out the shaded area.

Answer _____ cm^2

(Total 4 marks)

Q3.

Do not write outside the box

Three shops sell the same type and size of lip balm stick.

Shop A

£2.39 each

Shop B

£3.08 each

Buy one, get one half price

Shop C

Pack of 4

Was £11.40

Now $\frac{1}{6}$ off

Which shop is the best value for 8 sticks and what is the total cost in that shop?
Show working to support your answer.

Shop _____ Total cost £ _____

(Total 5 marks)

Do not write outside the box

Q4.

Work out $\dfrac{9.12 \times 10^{10}}{3.2 \times 10^{4}}$

Give your answer in standard form.

Answer _____

(Total 2 marks)

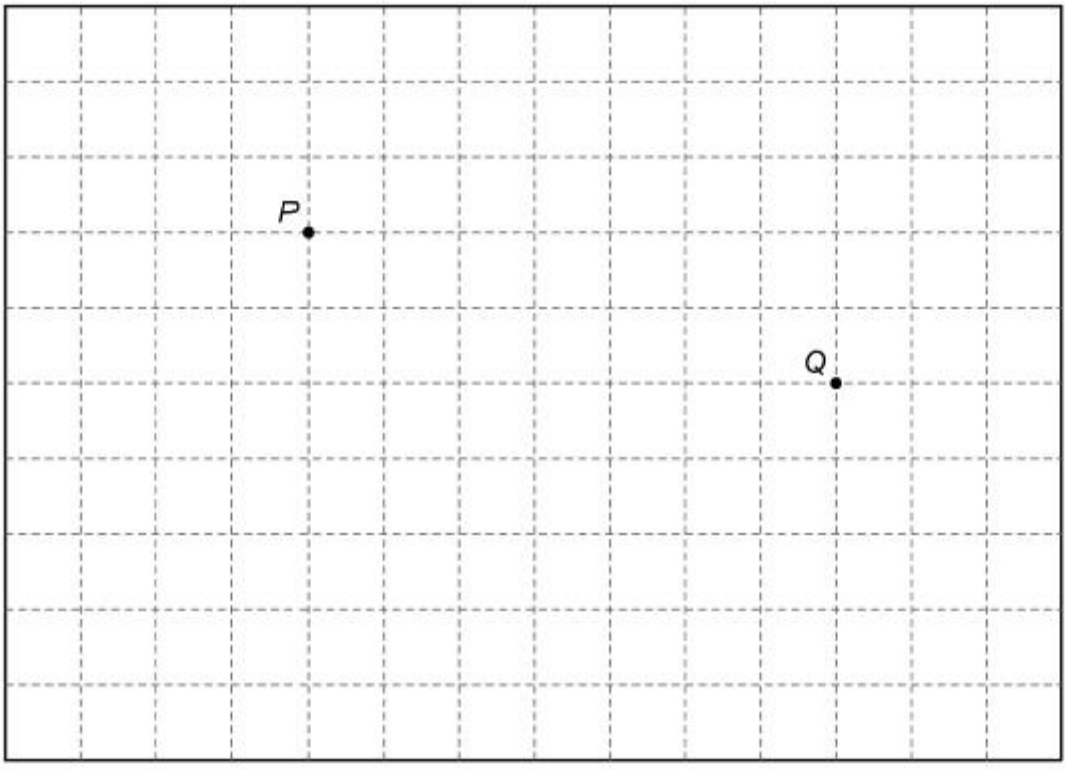
Q5.

The scale drawing represents a garden.

Water from a sprinkler at P reaches up to 20 metres from P.

Water from a sprinkler at Q reaches up to 25 metres from Q.

Scale: 1 cm represents 5 m



Using a pair of compasses,

show the region that water from **both** sprinklers reaches.

(Total 2 marks)

Q6.

What is 1.75 kilometres as a fraction of 700 metres?

Circle your answer.

$\frac{5}{2}$ $\frac{1}{4}$ $\frac{4}{1}$ $\frac{2}{5}$

(Total 1 mark)

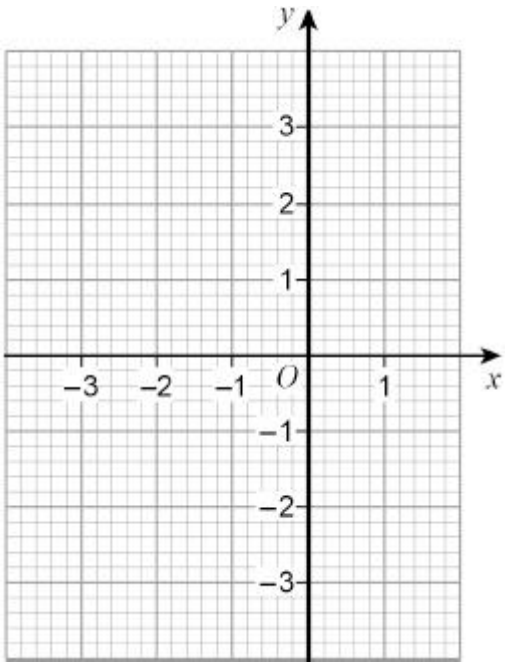
Q7.

(a) Complete the table of values for $y = x^2 + 2x$

x	–3	–2	–1	0	1
y	3		–1	0	

(2)

(b) Draw the graph of $y = x^2 + 2x$ for values of x from –3 to 1



(2)

(Total 4 marks)

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Q8.

The cost of a ticket increases by 10% to £19.25

Work out the original cost.

Answer £_____

(Total 3 marks)

Q9.

Expand $(x^2 - 9xy)(2x + 5y)$

Answer _____

(Total 2 marks)

Q10.

Work out the lowest common multiple (LCM) of 120 and 144

Answer _____

(Total 2 marks)

Q11.

Written as the product of prime factors,

$12\,600 = 2^3 \times 3^2 \times 5^2 \times 7$

and

$14\,112 = 2^5 \times 3^2 \times 7^2$

Work out the highest common factor (HCF) of 12 600 and 14 112

Give your answer as an integer.

Answer _____

(Total 2 marks)

Q12.

A building company employs

2 labourers
14 joiners
9 electricians
8 plumbers.

For a job, the company needs one of each type of worker.

(a) In how many ways can the company choose the four workers?

Answer _____

(2)

(b) One labourer and two plumbers are on holiday.

In how many ways can the company now choose the four workers?

Answer _____

(2)

(Total 4 marks)

Do not write outside the box

Q13.

The length of each side of a regular pentagon is 8.4 cm to 1 decimal place.

(a) Complete the error interval for the length of one side.

_____

_____ cm ≤ length < _____ cm

(2)

(b) Complete the error interval for the perimeter.

_____

_____ cm ≤ perimeter < _____ cm

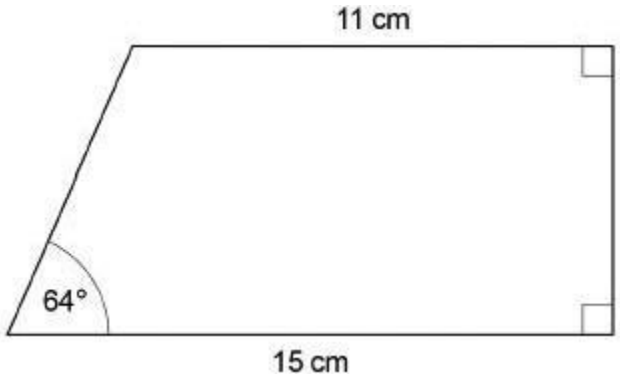
(1)

(Total 3 marks)

Q14.

Work out the area of the trapezium.

Not drawn accurately



_____

_____

_____

_____

_____

_____

_____

_____

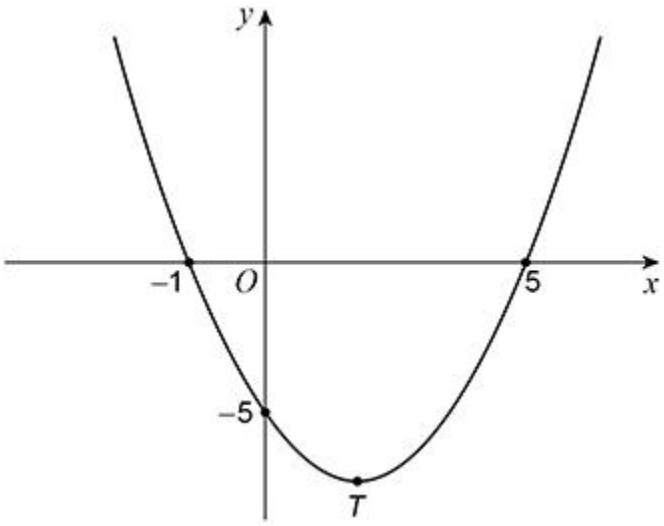
Answer _____ cm^2

(Total 4 marks)

Q15.

Do not write outside the box

Here is a sketch of the curve $y = x^2 - 4x - 5$



(a) Write down the **two** roots of $x^2 - 4x - 5 = 0$

Answer _____ and _____

(1)

(b) Work out the coordinates of *T*, the turning point of the curve.

_____

_____

_____

Answer (_____ , _____)

(2)

(Total 3 marks)

Q16.

Do not write outside the box

The mass of an ornament is m grams.

The height of the ornament is h centimetres.

m is directly proportional to the cube of h.

m = 1600 when h = 8

(a) Work out an equation connecting m and h.

Answer _____

(3)

(b) Work out the mass of an ornament of height 12 centimetres.

Answer = _____ grams

(2)

(Total 5 marks)

Q17.

Do not write outside the box

Barbie thinks that E and D are linked by the equation $E = \frac{36}{D}$

The graph shows the values of D and E for $2 \leqslant D \leqslant 6$

Choose **one** point on the graph and state if Barbie's equation is correct for that point.

_____

_____

_____

_____

_____

(Total 1 mark)

Q18.

Do not write outside the box

G is directly proportional to the square root of H.

$G : H = 3 : 2$ when $H = 16$

Work out $G : H$ when $H = 100$

Answer _____ : _____

(Total 4 marks)

Q19.

Here are the results after 250 spins of a coin.

Heads	128
Tails	122

The coin is spun an extra 50 times.

After all 300 spins, the relative frequency of Heads is 0.49

For the **extra 50 spins**, work out number of Heads : number of Tails

Answer _____ : _____

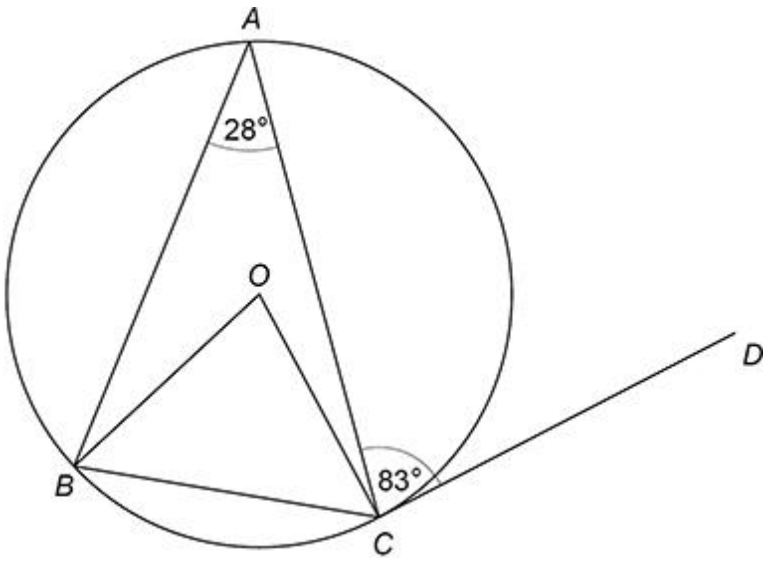
(Total 3 marks)

Q20.

Do not write outside the box

A, *B* and *C* are points on a circle, centre *O*.

DC is a tangent to the circle.



Not drawn accurately

Show that angle *ABO* : angle *ACO* = 3 : 1

(Total 5 marks)

Q21.

Do not write outside the box

Simplify fully $\frac{a^3b^2}{cd} \times \frac{c}{ab^5}$

Answer _____

(Total 3 marks)

Q22.

$x_{n+1} = \sqrt[3]{3x_n + 7}$

Use a starting value of $x_1 = 2$ to work out a solution to $x = \sqrt[3]{3x + 7}$

Give your answer to 3 decimal places.

Answer _____

(Total 3 marks)

Q23.

Do not write outside the box

(a) Write $x(3x - 9) = 4$ in the form $ax^2 + bx + c = 0$ where a, b and c are integers.

Answer _____

(1)

(b) Solve $x(3x - 9) = 4$

Give your answers to 2 decimal places.

Answer _____

(2)

(Total 3 marks)

Q24.

Solve $x^2 + 7x - 11 = 0$

Give your solutions as decimals.

Answer _____

(Total 2 marks)

Q25.

Do not write outside the box

$4y = 5x$

Which statement is correct?

Tick **one** box.

y is 80% of x ☐

y is 125% of x ☐

x is 20% of y ☐

x is 400% of y ☐

(Total 1 mark)

Q26.

Write $\frac{7}{2a^2} - \frac{3}{5a}$ as a single fraction in its simplest form.

Answer _____

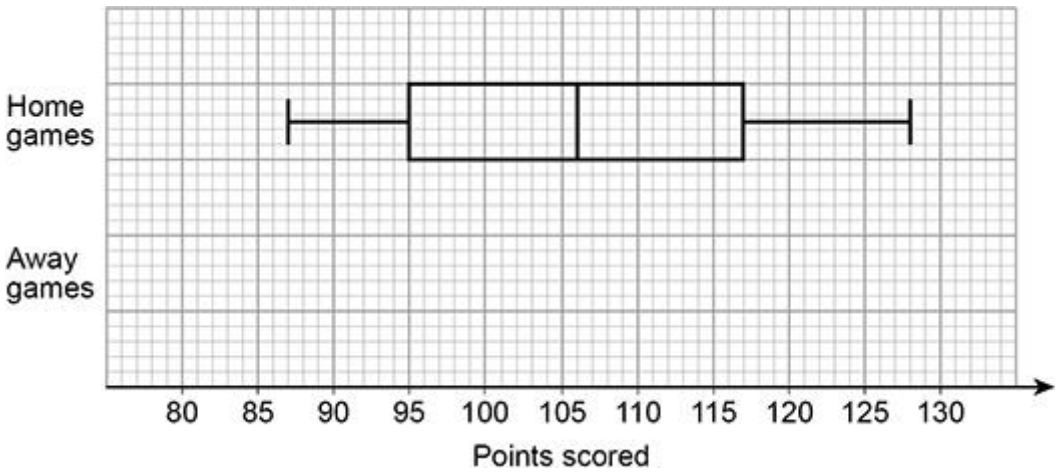
(Total 2 marks)

Q27.

Do not write outside the box

A basketball team plays 19 home games and 19 away games.

The box plot shows information about the points the team scored in **home** games.



Here are the points the team scored in the 19 **away** games.

85 89 93 95 96 96 98 98 98 99

100 103 105 107 109 110 114 119 126

(a) On the grid, draw a box plot for the away games.

(4)

(b) On average, did the team score more points in home games or away games?

Use **one** statistical measure to support your decision.

_____

_____

_____

_____

(1)

(c) Was the number of points scored more consistent in home games or away games?

Use **one** statistical measure to support your decision.

_____

_____

_____

(1)

(Total 6 marks)

Do not write outside the box

Q28.

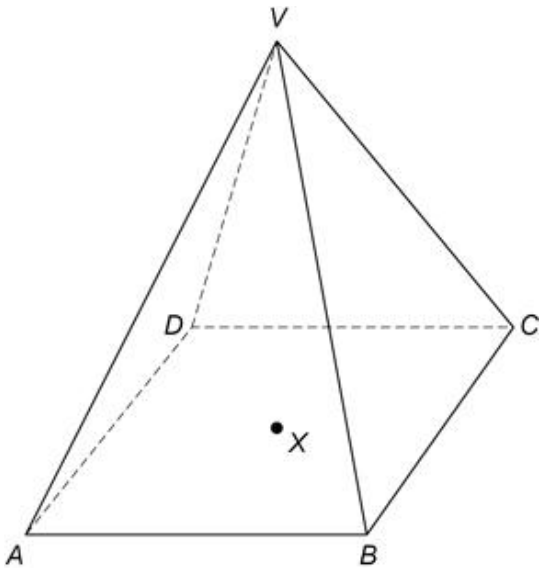
VABCD is a pyramid with a horizontal square base.

X is the centre of the base.

V is vertically above *X*.

BD = 18 cm

Angle *VBX* = 72°



Work out the length of *VB*.

_____

_____

_____

_____

_____

_____

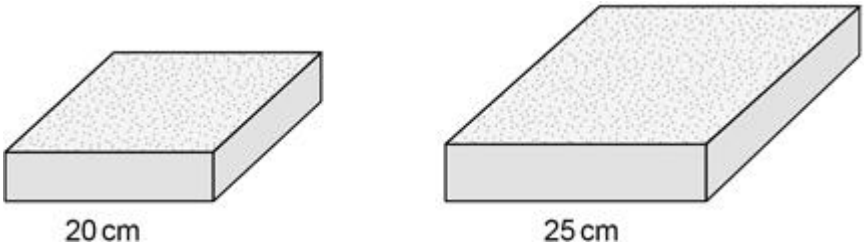
Answer _____ cm

(Total 3 marks)

Q29.

Here are two square-based paving stones.

The stones are similar solids.



The price per cm^3 is the same for both stones.

The price of the **larger** stone is £17.50

Work out the price of the smaller stone.

Answer £ _____

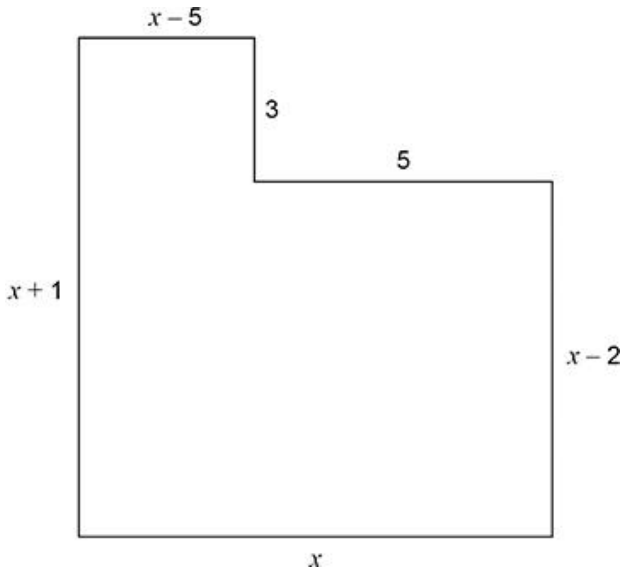
(Total 4 marks)

Do not write outside the box

Q30.

Here is the plan of the floor of an L-shaped room.

All lengths are in metres.



Not drawn accurately

(a) The area of the floor is 75 m^2

Show that $x^2 + x - 90 = 0$

(3)

(b) By factorising $x^2 + x - 90$ work out the value of x.

You **must** show your working

$x =$ _____

(2)

(Total 5 marks)

Q31.

Do not write outside the box

A bag contains discs.

Trial
A disc is chosen at random from the bag.
The colour of the disc is noted.
The disc is put back into the bag.

The trial is carried out 100 times.

The table shows the relative frequency of a blue disc after every 25 trials.

Total number of trials	25	50	75	100
Relative frequency of a blue disc	0.4	0.36	0.4	0.32

(a) For the trials from the 26th to the 50th, how many times was a blue disc chosen?

Answer _____

(2)

(b) There is a total of 1000 discs in the bag.

Work out the **best** estimate of the number of blue discs in the bag.

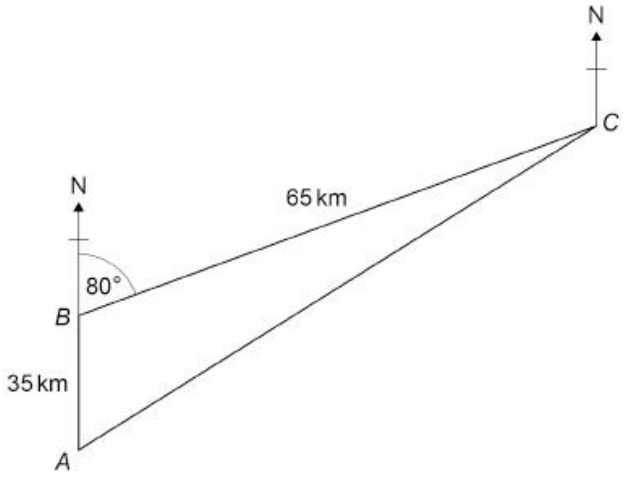
Answer _____

(1)

(Total 3 marks)

Q32.

Do not write outside the box



Not drawn accurately

A boat sails 35 km North from *A* to *B*.

From *B* the boat sails to *C* and then back to *A*.

(a) Show that the distance the boat sails from *C* to *A* is 79 km to the nearest km

You **must** show your working.

(2)

(b) Work out the bearing of *A* from *C*.

Answer _____ °

(4)

(Total 6 marks)

Q33.

Do not write outside the box

A straight line

is perpendicular to the straight line through (2, 8) and (6, 15)

and

passes through (0, 9) and (x, 17)

Work out the value of x.

x = _____

(Total 4 marks)

Q34.

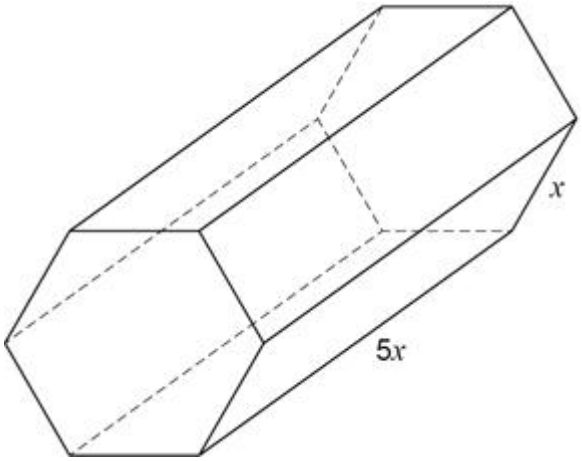
Do not write outside the box

A chocolate box in the shape of a prism is being designed.

All lengths are in centimetres.

The cross section is a regular hexagon with side x

The length is $5x$



An expression for the area of the cross section, in cm^2, is $\frac{3\sqrt{3}}{2}x^2$

The **total** surface area of the box must be less than 650 cm^2

Work out the largest possible **integer** value of x.

You **must** show your working.

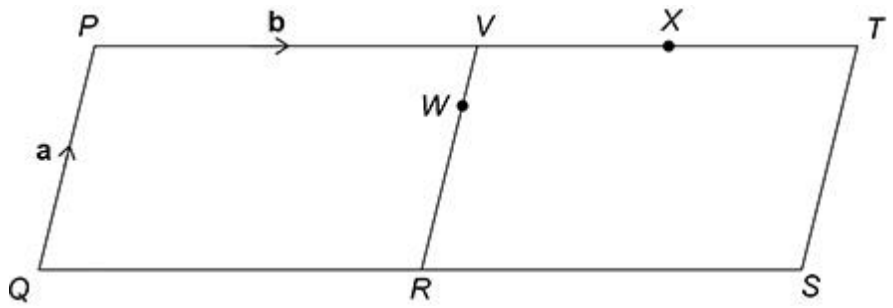
Answer _____

(Total 4 marks)

Q35.

Do not write outside the box

Two congruent parallelograms, *PQRV* and *VRST*, are joined.



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$\overrightarrow{QP}$ = **a** $\overrightarrow{PV}$ = **b**

X is the midpoint of *VT*.

VW : *WR* = 1 : 2

Prove that *Q, W* and *X* lie on a straight line.

(Total 3 marks)

Q36.

Do not write outside the box

Show that, for $x \neq -1$

$\frac{8x^2 - 8}{4x + 4}$ simplifies to the form $ax + b$ where a and b are integers.

(Total 3 marks)

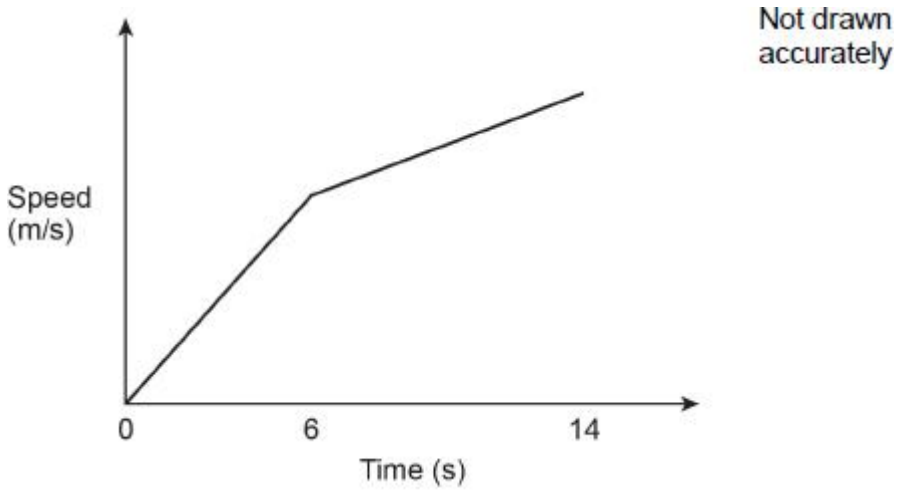
Q37.

Do not write outside the box

Izzy runs an 80-metre race in 14 seconds.

During the first 6 seconds her speed increases at a constant rate.
During the last 8 seconds her speed increases at a different constant rate.
Her speed at 14 seconds is 2 m/s more than her speed at 6 seconds.

Here is a sketch of her speed-time graph.



(a) Work out her acceleration during the last 8 seconds.
State the units of your answer.

Answer _____

(2)

(b) When Izzy finishes the 80-metre race, her speed is v m/s

Work out the value of v.

Answer _____

(4)

(Total 6 marks)

END OF QUESTIONS

There are no questions printed on this page

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