Please check the examination details below before entering your candidate information

Candidate surname Solved by Mr. Pabitra | Other names

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Wednesday 4 June 2025

Morning (Time: 2 hours) | Paper reference **4MA1/2H**

Mathematics A

PAPER 2H
Higher Tier

Solved by Mr. Pabitra.



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
- Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Solved by Mr. Pabitra | Math Tonic

Turn over

P78945A

©2025 Pearson Education Ltd.

P 7 8 9 4 5 A 0 1 2 8

Pearson

International GCSE Mathematics

Formulae sheet – Higher Tier

Arithmetic series

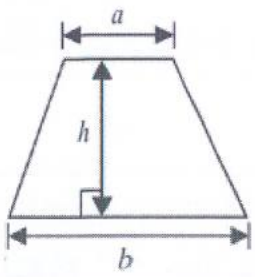
Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

The quadratic equation

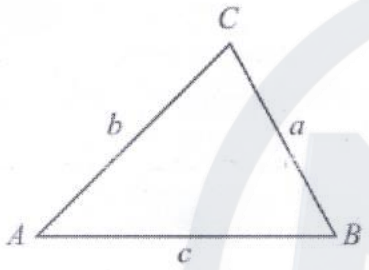
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

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

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



Trigonometry



In any triangle ABC

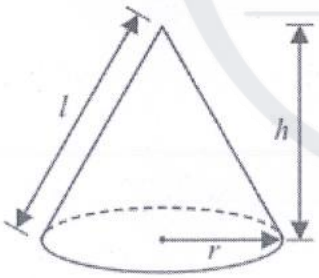
Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

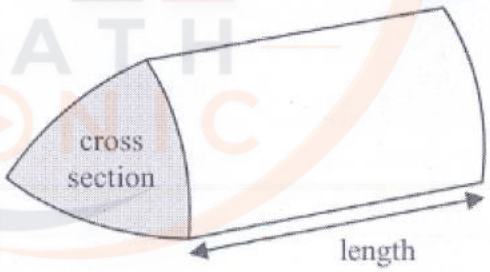
Area of triangle $= \frac{1}{2}ab\sin C$

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

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

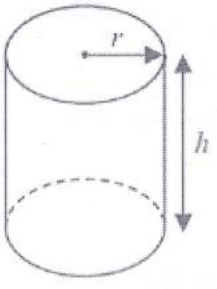


Volume of prism
= area of cross section × length



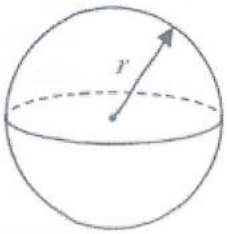
Volume of cylinder $= \pi r^2 h$

Curved surface area of cylinder $= 2\pi r h$



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

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



DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

Answer ALL TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Rio has six cards.
He writes a number on each card so that

the range of the numbers is 10
the median of the numbers is 7.5
the mode of the numbers is 6

Rio arranges the cards so that the numbers are in order of size.

4	6	6	9	10	14

↓ 7.5

Three of the numbers are hidden.

Complete the cards above to show the three numbers that are hidden.

Range = 10

14 − Smallest NO = 10

Smallest NO = 14 − 10 = 4

$$\frac{6+y}{2} = 7.5$$

$$6+y = 2 \times 7.5$$

$$6+y = 15$$

$$y = 15-6$$

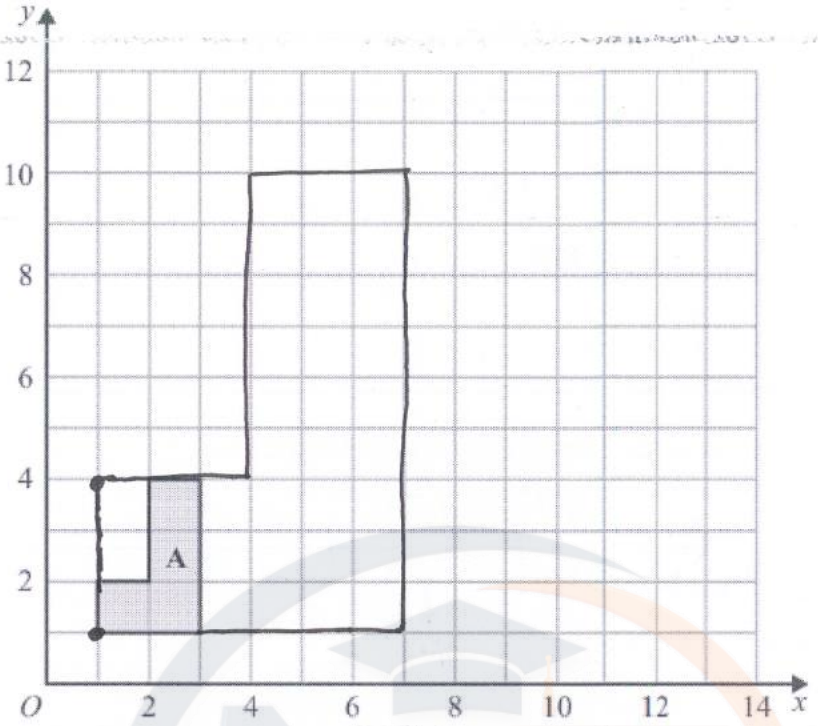
$$y = 9$$

(Total for Question 1 is 3 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

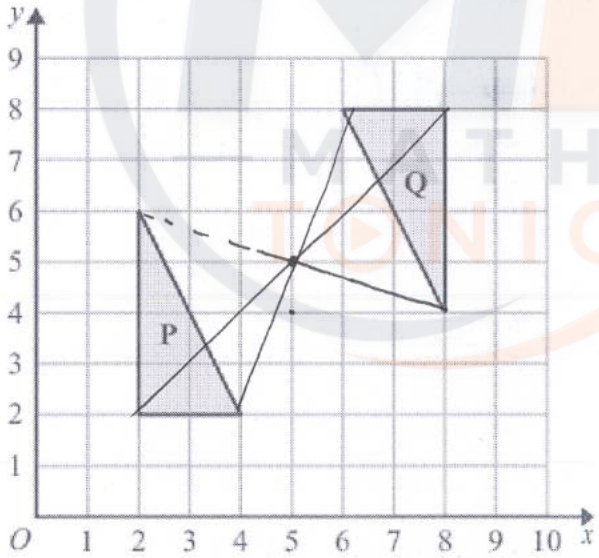
Solved by Mr. Pabitra

2



(a) On the grid, enlarge shape **A** with scale factor 3 and centre (0, 1)

(2)



(b) Describe fully the single transformation that maps triangle **P** onto triangle **Q**

180° rotation about the centre (5,5)

(3)

(Total for Question 2 is 5 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

3 Show that $7\frac{1}{3} - 3\frac{4}{7} = 3\frac{16}{21}$

$$\frac{22}{3} - \frac{25}{7}$$

$$\frac{22 \times 7 - 25 \times 3}{3 \times 7}$$

$$\frac{154 - 75}{21} = \frac{79}{21} = 3\frac{16}{21}$$

(Total for Question 3 is 3 marks)

4 Using ruler and compasses only, construct the perpendicular bisector of the line AB
Show all your construction lines.



(Total for Question 4 is 2 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
MATH TONIC
Solved by Mr. Pabitra

5 The diagram shows two similar quadrilaterals, *ABCD* and *EFGH*

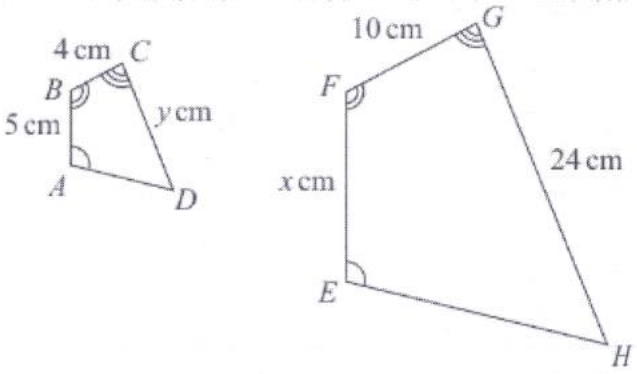


Diagram **NOT** accurately drawn

$AB = 5\,\text{cm}$ $BC = 4\,\text{cm}$ $CD = y\,\text{cm}$

$EF = x\,\text{cm}$ $FG = 10\,\text{cm}$ $GH = 24\,\text{cm}$

(a) Work out the value of x

length scale factor $= \frac{10}{4} = 2.5$

$x = 5 \times 2.5 = 12.5$

$x =$ 12.5 cm

(2)

(b) Work out the value of y

$y = \frac{24}{2.5} = 9.6$

$y =$ 9.6 cm

(2)

(Total for Question 5 is 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

MATH TONIC

Solved by Mr. Pabitra

6 Pau, Sam and Tia share £240 in the ratios 3 : 4 : 5

Sam and Tia each give £10 of their share to Pau.

Work out the ratios of the amounts of money that Pau, Sam and Tia now have.
Give your answer in its simplest form.

$3+4+5=12$

P : S : T

3 : 4 : 5

$\frac{3}{12} \times 240$

£60

$\frac{4}{12} \times 240$

£80

$\frac{5}{12} \times 240$

£100

Now Pau received $= 60+10+10 = 80$

Sam $= 80-10 = 70$

Tia $= 100-10 = 90$

P : S : T

80 : 70 : 90

8 : 7 : 9

8 : 7 : 9

(Total for Question 6 is 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

7 Tim buys a bracelet for 4000 Swiss francs.
The value of the bracelet increases by 7% each year.

Work out the value of the bracelet at the end of 3 years.
Give your answer correct to the nearest Swiss franc.

$$4000\left(1+\frac{7}{100}\right)^3$$

4900.172

4900 Swiss francs

4900 Swiss francs

(Total for Question 7 is 3 marks)

8 Solve the simultaneous equations

$$3x + 5y = 8 \quad \text{(i)}$$
$$4x + y = -3.5 \quad \text{(ii)}$$

Show clear algebraic working.

(i) $\Rightarrow 3x + 5y = 8$

(ii) $\times 5 \Rightarrow 20x + 5y = -17.5$

$-17x = 25.5$

$x = \frac{25.5}{-17}$

$x = -1.5$

$4x + y = -3.5$

$4 \times (-1.5) + y = -3.5$

$-6 + y = -3.5$

$y = -3.5 + 6$

$y = 2.5$

$x =$ −1.5

$y =$ 2.5

(Total for Question 8 is 3 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

9 (a) Solve the inequality $7 - 3t < 2t + 15$

$7 - 15 < 2t + 3t$

$-8 < 5t$

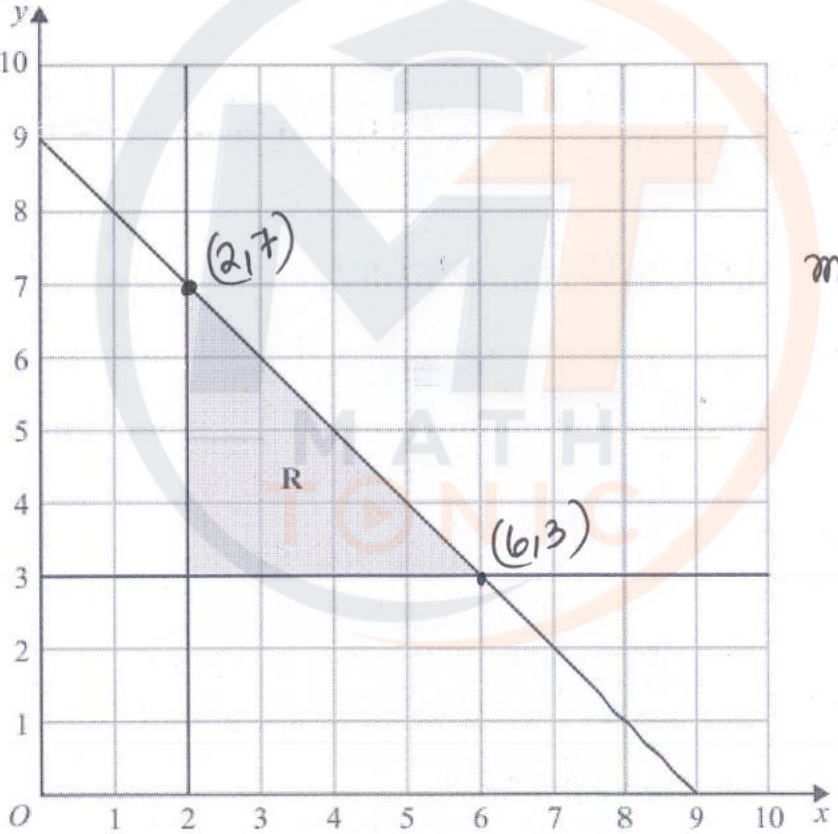
$\frac{-8}{5} < t$

$-1.6 < t$

$t > -1.6$

(2)

The region **R**, shown shaded in the diagram, is bounded by three straight lines.



$m = \frac{3-7}{6-2}$

$m = \frac{-4}{4}$

$m = -1$

(b) Write down three inequalities that define the region **R**

$y \geq 3$

$x \geq 2$

$y \leq -x + 9$

(3)

(Total for Question 9 is 5 marks)

Solved by Mr. Pabitra

10 ABD and ABC are right-angled triangles.

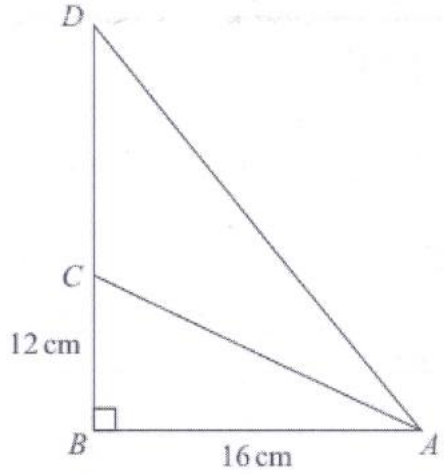


Diagram **NOT** accurately drawn

$AB = 16\,\text{cm}$ $BC = 12\,\text{cm}$ $AD = 1.5 \times AC$

Find the length of CD
Give your answer correct to 3 significant figures.

$AC = \sqrt{12^2+16^2} = \sqrt{144+256} = \sqrt{400} = 20\,\text{cm}$

$AD = 1.5 \times 20 = 30\,\text{cm}$

$BD = \sqrt{30^2-16^2}$

$BD = 25.37\,\text{cm}$

$CD = BD - BC$

$CD = 25.37 - 12$

$CD = 13.37\,\text{cm}$

$\boxed{CD = 13.4\,\text{cm}}$

13.4 cm

(Total for Question 10 is 5 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

11 Khalid has a box of counters.

17 of the counters are red
28 of the counters are blue
the rest of the counters are orange

Khalid is going to take at random a counter from the box.

The probability that Khalid will take an orange counter is $\frac{4}{9}$

Work out the number of orange counters that are in the box.

let no of Orange Counters are x

Total Counters = $17+28+x = 45+x$

$P(\text{Orange}) = \frac{4}{9}$

$\frac{x}{45+x} = \frac{4}{9}$

$4(45+x) = 9x$

$180 + 4x = 9x$

$9x - 4x = 180$

$5x = 180$

$x = \frac{180}{5}$

$\boxed{x = 36}$

36

(Total for Question 11 is 3 marks)

12 Expand and simplify $3x(2x+5)(7x-4)$

$3x\left[14x^2 - 8x + 35x - 20\right]$

$3x\left[14x^2 + 27x - 20\right]$

$42x^3 + 81x^2 - 60x$

$42x^3 + 81x^2 - 60x$

(Total for Question 12 is 3 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

13 The frequency table gives information about the times, in minutes, that 60 people took to complete a puzzle.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	13
$20 < t \leqslant 30$	12
$30 < t \leqslant 40$	17
$40 < t \leqslant 50$	7
$50 < t \leqslant 60$	3

(a) Complete the cumulative frequency table.

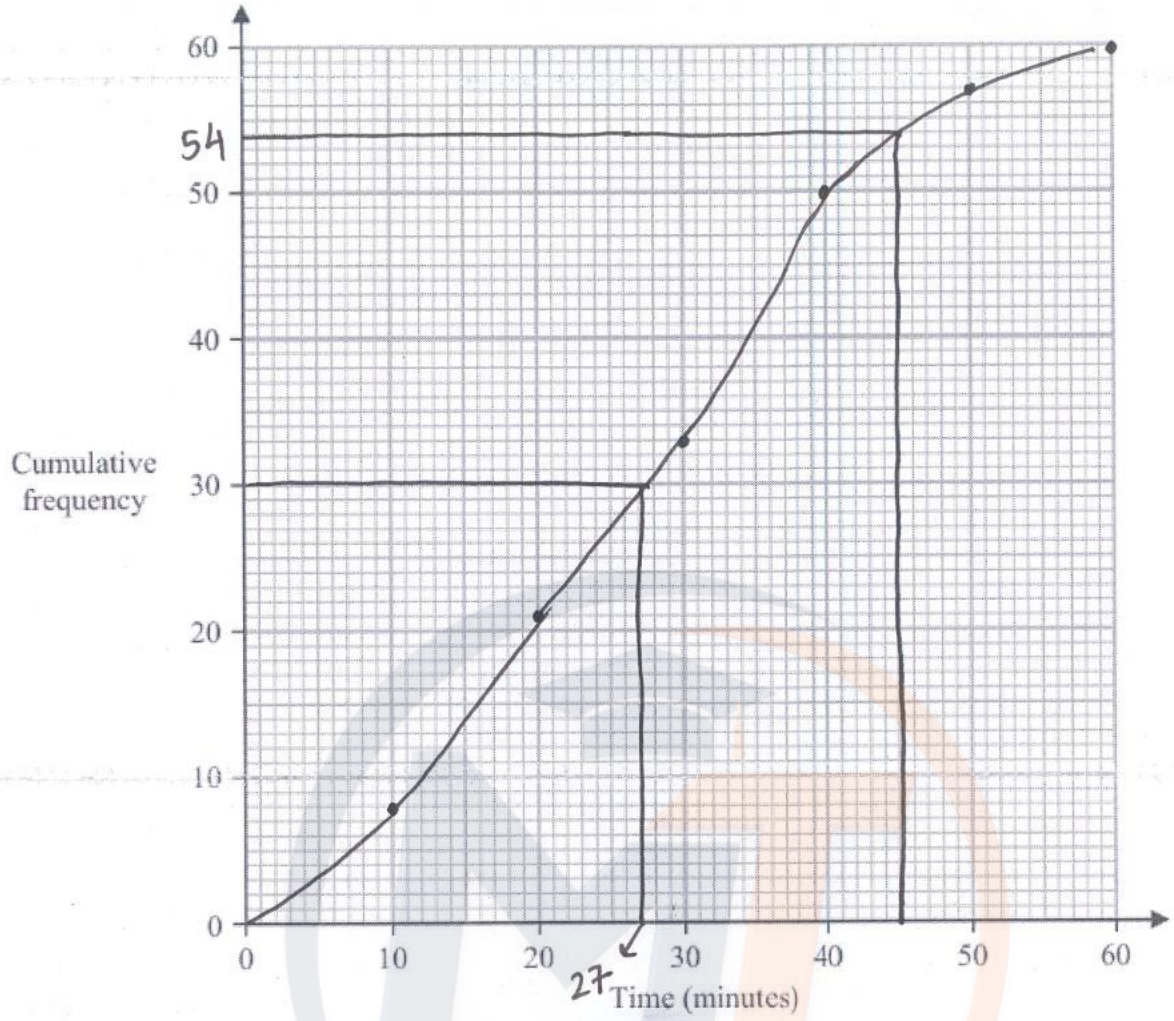
Time (t minutes)	Cumulative frequency
$0 < t \leqslant 10$	8
$0 < t \leqslant 20$	$8+13 = 21$
$0 < t \leqslant 30$	$21+12 = 33$
$0 < t \leqslant 40$	$33+17 = 50$
$0 < t \leqslant 50$	$50+7 = 57$
$0 < t \leqslant 60$	$57+3 = 60$

(1)

(b) On the grid opposite, draw a cumulative frequency graph for your table.

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra



(2)

(c) Use your graph to find an estimate for the median time.

27 minutes

(1)

(d) Use your graph to find an estimate for the number of these people who took more than 45 minutes to complete the puzzle.

$60 - 54 = 6$

6

(2)

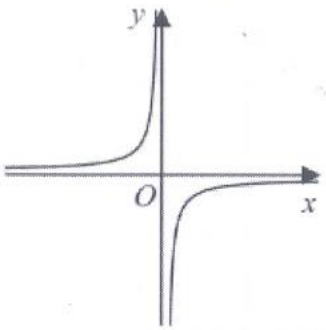
(Total for Question 13 is 6 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

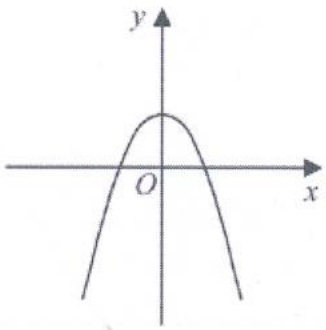
Solved by Mr. Pabitra

14 Here are five graphs.

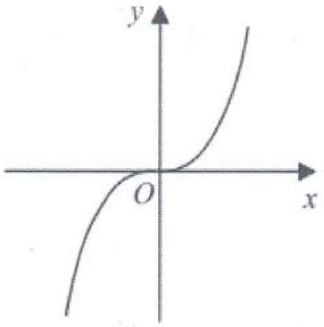
A



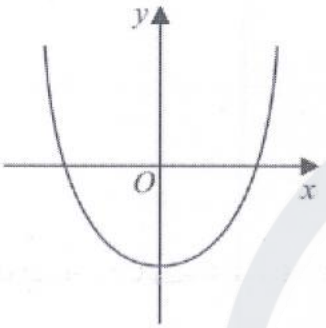
B



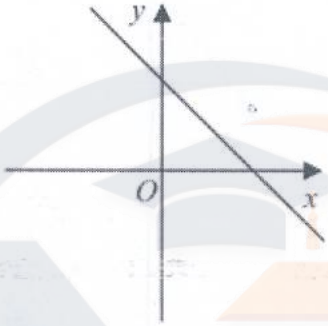
C



D



E



(a) Write down the letter of the graph that could have the equation $y = 5 - x^2$

B

(1)

(b) Write down the letter of the graph that could have the equation $y = 2x^3$

C

(1)

(Total for Question 14 is 2 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

15 Simplify fully $\left(\frac{2a^3}{10a^7c^2}\right)^{-3}$

$$\left(\frac{10a^7c^2}{2a^3}\right)^{-3} = \left(5a^{7-3}c^2\right)^3$$

$$= \left(5a^4c^2\right)^3$$

$$= 5^3 \times (a^4)^3 \times (c^2)^3$$

$$= 125 \times a^{12} \times c^6$$

$125a^{12}c^6$

(Total for Question 15 is 3 marks)

16 Make t the subject of the formula $c = \frac{t^2+3}{7-8t^2}$

$$c(7-8t^2) = t^2+3$$

$$7c - 8ct^2 = t^2+3$$

$$7c-3 = t^2+8ct^2$$

$$7c-3 = t^2(1+8c)$$

$$\frac{7c-3}{1+8c} = t^2$$

$$t = \pm\sqrt{\frac{7c-3}{1+8c}}$$

$t = \pm\sqrt{\frac{7c-3}{1+8c}}$

(Total for Question 16 is 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

17 $y = 4x^3 + 5x^2 + 2x$

(a) Find $\frac{dy}{dx}$

$= 4(3x^2) + 5(2x) + 2(1)$

$= 12x^2 + 10x + 2$

$\frac{dy}{dx} = 12x^2 + 10x + 2$

(2)

(b) Find the coordinates of the turning points on the graph with equation $y = 4x^3 + 5x^2 + 2x$
Show clear algebraic working.

at turning point $\frac{dy}{dx} = 0$

$12x^2 + 10x + 2 = 0$

$6x^2 + 5x + 1 = 0$

$(2x+1)(3x+1) = 0$

$2x + 1 = 0$

$2x = -1$

$x = -1/2$

$3x + 1 = 0$

$3x = -1$

$x = -1/3$

$y = 4(-1/2)^3 + 5(-1/2)^2 + 2(-1/2)$

$y = -1/4$

$y = 4(-1/3)^3 + 5(-1/2)^2 + 2(-1/2)$

$y = -7/27$

$(-1/2, -1/4)$ and $(-1/3, -7/27)$

(4)

(Total for Question 17 is 6 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

18 Use algebra to show that $0.\dot{7}0\dot{2} = \frac{26}{37}$

$x = 0.702\,702\,702\ldots$

$\times 1000 \left(\qquad \right) \times 1000$

$1000x = 702.702\,702\,702\ldots$

$1000x - x = 702$

$999x = 702$

$x = \frac{702}{999} = \frac{78}{111} = \frac{26}{37}$

(Total for Question 18 is 2 marks)

19 Solve the inequality $4x^2 + 4x - 15 < 0$
Show clear algebraic working.

$4x^2 + 4x - 15 < 0$

$4x^2 + 4x - 15 = 0$

$(2x+5)(2x-3) = 0$

$2x+5=0 \qquad 2x-3=0$

$x = -5/2 \qquad x = 3/2$



$-5/2 < x < 3/2$

(Total for Question 19 is 3 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
MATHTONIC
Solved by Mr. Pabitra

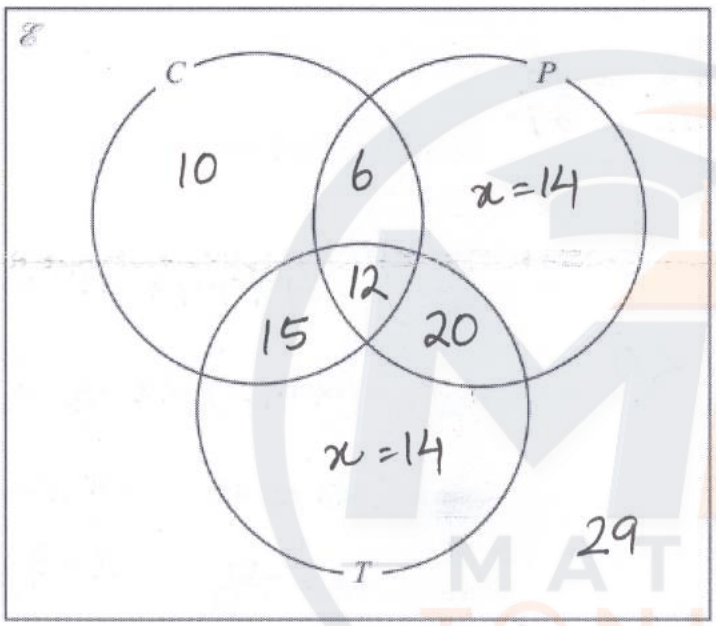
20 120 gardeners were asked if they grow carrots (C) or potatoes (P) or tomatoes (T)

Of these gardeners

43 grow carrots
12 grow carrots and potatoes and tomatoes
18 grow carrots and potatoes
27 grow carrots and tomatoes
32 grow potatoes and tomatoes
29 do not grow carrots or potatoes or tomatoes

The number of these gardeners who grow only potatoes is equal to the number of these gardeners who grow only tomatoes.

(a) Complete the Venn diagram to show this information.



$10+6+12+15+20+29+x+x$

$= 120$

$92 + 2x = 120$

$2x = 120 - 92$

$2x = 28$

$\boxed{x = 14}$

(3)

(b) Find $n(T' \cap C)$

$10+6 = 16$

16

(1)

One of the gardeners who grows carrots is chosen at random.

(c) Calculate the probability that this gardener also grows potatoes.

$$\frac{6+12}{43} = \frac{18}{43}$$

(2)

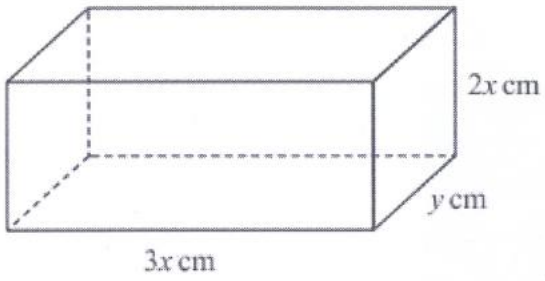
(Total for Question 20 is 6 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

21 The diagram shows a cuboid.

Diagram **NOT** accurately drawn



The cuboid measures $3x$ cm by $2x$ cm by y cm

The volume of the cuboid is 1014 cm^3
The total surface area of the cuboid is A cm^2

Show that $A = 12x^2 + \frac{1690}{x}$

You must show all the stages of your working.

Volume $= 2x \times 3x \times y$

Volume $= 6x^2y$

$6x^2y = 1014$

$y = \frac{1014}{6x^2}$

$y = \frac{169}{x^2}$

Surface Area of Cuboid

$2(lw) + 2wh + 2lh$

$2 \times 3x \times y + 2 \times y \times 2x + 2 \times 3x \times 2x$

$6xy + 4xy + 12x^2$

$10xy + 12x^2$

$10x \times \frac{169}{x^2} + 12x^2$

$\frac{1690}{x} + 12x^2$

$\boxed{12x^2 + \frac{1690}{x}}$

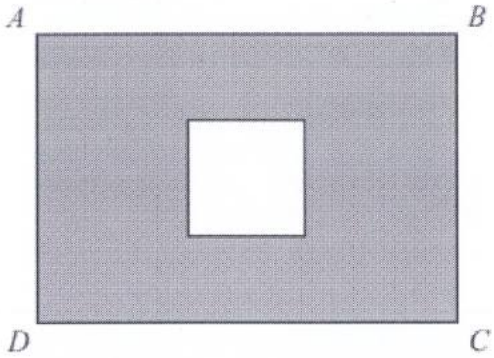
(Total for Question 21 is 3 marks)

Solved by Mr. Pabitra

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

22 The diagram shows a square inside rectangle $ABCD$

Diagram **NOT** accurately drawn



The total area of the region shown shaded in the diagram is X cm²

$AB = 11.5$ cm correct to the nearest 0.5 cm
$BC = 9.2$ cm correct to 2 significant figures
side of square = 4.1 cm correct to 2 significant figures

By considering bounds, work out the value of X to a suitable degree of accuracy.
Show your working clearly.

LB		UB
11.25	AB = 11.5	11.75
9.15	BC = 9.2	9.25
4.05	Side = 4.1	4.15

X = Area of Rectangle − Area of square

X_{UB} = UB − LB

$X_{UB} = (11.75 \times 9.25) - (4.05 \times 4.05)$

$X_{UB} = 92.285$

X_{LB} = LB − UB

$X_{LB} = (11.25 \times 9.15) - (4.15 \times 4.15)$

$X_{LB} = 85.715$

	1sf	2sf
$X_{UB} = 92.285$	90 ✓	92
$X_{LB} = 85.715$	90 ✓	86

$X =$ 90

(Total for Question 22 is 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

23 $\frac{4x^2-4x-120}{5x^2-180} \div \frac{x^2+5x}{10x^2+60x} = p$ where p is an integer.

Find the value of p

Show clear algebraic working.

$4x^2-4x-120 = 4[x^2-x-30]$

$= 4(x-6)(x+5)$

$5x^2-180 = 5(x^2-36)$

$= 5(x+6)(x-6)$

$x^2+5x = x(x+5)$

$10x^2+60x = 10x(x+6)$

$\frac{4(x-6)(x+5)}{5(x+6)(x-6)} \div \frac{x(x+5)}{10x(x+6)}$

$\frac{4(x-6)(x+5)}{5(x+6)(x-6)} \times \frac{10x(x+6)}{x(x+5)}$

$\frac{4 \times 10}{5} = 8$

$p =$ 8

(Total for Question 23 is 4 marks)

Solved by Mr. Pabitra

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

24 The diagram shows a square-based pyramid $ABCDE$

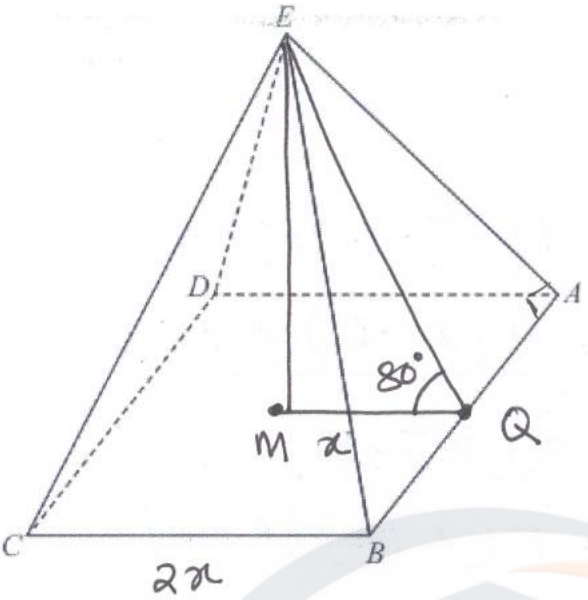


Diagram **NOT** accurately drawn

$EA = EB = EC = ED$

M is the centre of the horizontal square base $ABCD$
Q is the midpoint of AB
Angle $EQM = 80°$

$EA : AB = n : 1$

Find the value of n
Give your answer correct to 3 significant figures.

let $AD = DC = AB = BC = 2x$

In $\triangle EMQ$

$$EQ = \frac{MQ}{\cos 80}$$

$$EQ = \frac{x}{\cos 80}$$

$$\boxed{EQ = 5.76x}$$

In $\triangle EAQ$

$$EA^2 = EQ^2 + QA^2$$
$$EA^2 = (5.76x)^2 + x^2$$
$$EA^2 = 33.177x^2 + x^2$$

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

$EA = \sqrt{34.177x^2}$

$EA = 5.846x$

$EA : AB$

$\div 2x \left(\begin{matrix} 5.846x : 2x \\ 2.92 : 1 \end{matrix} \right) \div 2x$

$n =$ 2.92

(Total for Question 24 is 4 marks)

Turn over for Question 25

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

25 (a) Write $28+24x-6x^2$ in the form $a-b(x-c)^2$ where a, b and c are integers.

$-6x^2+24x+28$

$-6[x^2-4x]+28$

$-6[(x-2)^2-2^2]+28$

$-6[(x-2)^2-4]+28$

$-6(x-2)^2+24+28$

$-6(x-2)^2+52$

$52-6(x-2)^2$

$52-6(x-2)^2$

(3)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

MATH TONIC

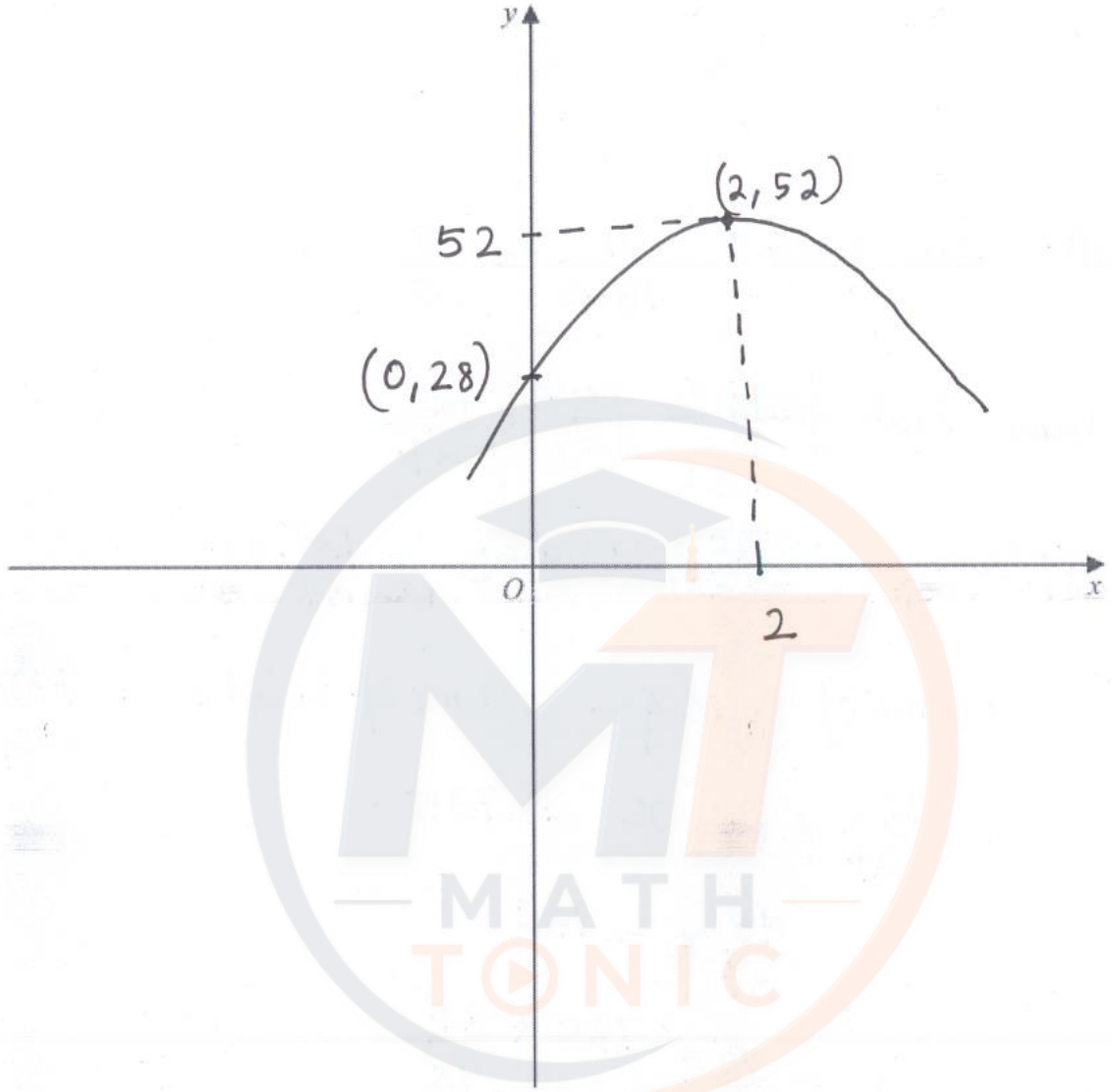
Solved by Mr. Pabitra

(b) On the axes below, sketch the graph of $y = 28 + 24x - 6x^2$

$y = 52 - 6(x-2)^2$

Turning point $(2, 52)$

Show clearly the coordinates of the turning point and the coordinates of the point of intersection of the graph with the y-axis.



(3)

(Total for Question 25 is 6 marks)

$y = 52 - 6(x-2)^2$

$y = 52 - 6(0-2)^2$

$y = 52 - 6 \times 4$

$y = 52 - 24$

$y = 28$

Turn over for Question 26

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

26 **A** and **B** are two similar solids.

The height of solid **A** is 31 cm
The height of solid **B** is 18.6 cm

Given that

volume of solid **A** – volume of solid **B** = 735 cm³

find the volume of solid **A**

let volume of Solid B = x

Length Scale factor : $\frac{31}{18.6} = \frac{5}{3}$

Volume Scale factor = $\left(\frac{5}{3}\right)^3 = \frac{125}{27}$

$\text{Volume}_A = \frac{125}{27} \times \text{Volume}_B = \frac{125}{27}x$

Volume of Solid A − Volume of Solid B = 735 cm³

$\frac{125}{27}x - x = 735$

$\frac{98}{27}x = 735$

$x = 735 \times \frac{27}{98}$

$\boxed{x = 202.5}$

Volume of Solid A : $\frac{125}{27} \times 202.5 = 937.5$

937.5 cm³

(Total for Question 26 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Solved by Mr. Pabitra

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

MATH TONIC

Solved by Mr. Pabitra

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

MATH TONIC

Solved by Mr. Pabitra