Pearson Edexcel International GCSE

Mathematics A

Modular Unit 1

November 2024 Reconstructed Past Paper

DETAILED SOLUTIONS

Original question followed by a full worked solution

28 adaptive question sections 79 marks

Selected from Linear Higher Papers 1H and 2H

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L-to-M | CONVERTED MODULAR EDITION

Selected from Linear Higher papers; not an original Modular examination paper.

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About this reconstructed paper

Each question section appears in the same order as the Student book: the complete source demand is followed by its demand-local worked solution and final answer.

Ownership rule: Unit 2 owns a demand when its assessed or terminal statement is Unit 2, even if Unit 1 skills are prerequisites. For example, drawing boundary lines supports the Unit 2 region-of-inequalities demand. This book contains the demands owned by Unit 1; the selection contains 79 marks.

This is an Elite reconstructed teaching paper selected from official Linear Higher material; it is not an official Pearson Modular examination paper. Source assets are retained for private teaching use.

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Original question 01

4MA1-1H Q3 M01

MODULAR UNIT 1

1 marks

3 (a) Simplify $\left(p^3\right)^5$

.....

(1)

Worked solution 01

Simplify a power of a power

MODULAR UNIT 1
1 marks

M01 – Simplify a power of a power

Use the power rule

$$(p^3)^5 = p^{3\times 5} = p^{15}.$$

Final answer

$$p^{15}$$

Original question 02

4MA1-1H Q3 M02

MODULAR UNIT 1

2 marks

(b) Expand and simplify $2n(4n+3)+n(n-4)$

.....

(2)

Worked solution 02

Expand and simplify

MODULAR UNIT 1
2 marks

M02 – Expand and simplify

Expand both products

$$2n(4n+3)+n(n-4)=8n^2+6n+n^2-4n.$$

Collect like terms

$$=9n^2+2n.$$

Final answer

$$9n^2+2n$$

Original question 03

4MA1-1H Q3 M03

MODULAR UNIT 1

3 marks

(c) Solve $\dfrac{2x+5}{3} = 4 - x$

Show clear algebraic working.

$x =$ .....

(3)

Worked solution 03

Solve the linear equation

MODULAR UNIT 1

3 marks

M03 – Solve the linear equation

Clear the denominator

$$(2x+5)/3 = 4 - x \Rightarrow 2x + 5 = 12 - 3x.$$

Collect x terms

$$5x = 7.$$

Divide

$$x = 7/5.$$

Final answer

$$x = \frac{7}{5}$$

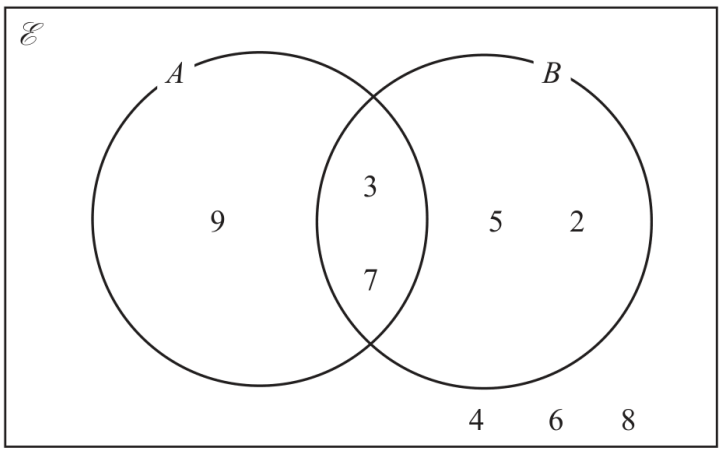
Original question 04

4MA1-1H Q4 M01

MODULAR UNIT 1

1 marks

4 Here is a Venn diagram.



(a) List the members of the set B

.....

(1)

Worked solution 04

List the members of B

MODULAR UNIT 1
1 marks

M01 – List the members of B

Read the B circle

The elements inside B are 2,3,5,7.

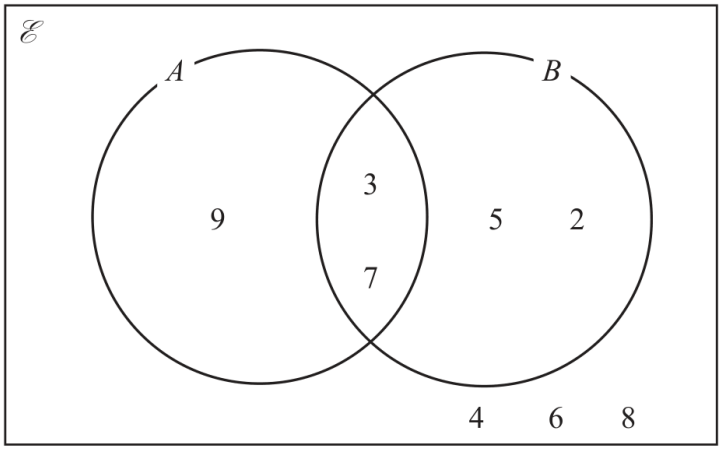
Final answer

$$B = \{2, 3, 5, 7\}$$

Original question 05
4MA1-1H Q4 M02

MODULAR UNIT 1
1 marks

4 Here is a Venn diagram.



(b) List the members of the set $A \cap B$

.....

(1)

Worked solution 05

List the intersection

MODULAR UNIT 1

1 marks

M02 – List the intersection

Read the overlap

The common elements in A and B are 3 and 7.

Final answer

$$A \cap B = \{3, 7\}$$

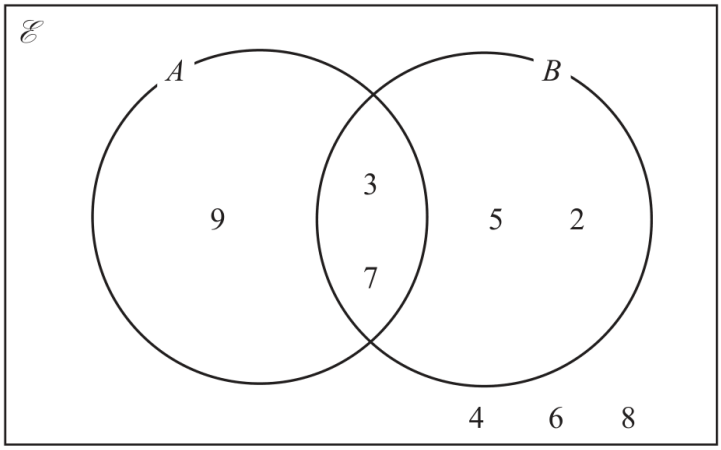
Original question 06

4MA1-1H Q4 M03

MODULAR UNIT 1

1 marks

4 Here is a Venn diagram.



(c) List the members of the set A'

.....

(1)

Worked solution 06

List the complement

MODULAR UNIT 1

1 marks

M03 – List the complement

Read outside A

The elements in the universal set but not in A are 2,4,5,6,8.

Final answer

$$A' = \{2, 4, 5, 6, 8\}$$

Original question 07

4MA1-1H Q8 M01, M02

MODULAR UNIT 1

3 marks

8 (a) (i) Factorise $x^2 + 5x - 24$

.....

(2)

(ii) Hence, solve $x^2 + 5x - 24 = 0$

.....

(1)

Worked solution 07

Factorise a quadratic / Solve the factorised equation

MODULAR UNIT 1
3 marks

M01 – Factorise a quadratic

Find two numbers

The product is -24 and the sum is 5, so use 8 and -3.

Write the factors

$$x^2 + 5x - 24 = (x + 8)(x - 3).$$

Final answer

(x+8)(x-3)

M02 – Solve the factorised equation

Set each factor to zero

$$x + 8 = 0 \text{ or } x - 3 = 0.$$

State both roots

$$x = -8 \text{ or } x = 3.$$

Final answer

$$x = -8 \text{ or } x = 3$$

Original question 08

4MA1-1H Q11 M01, M02

MODULAR UNIT 1

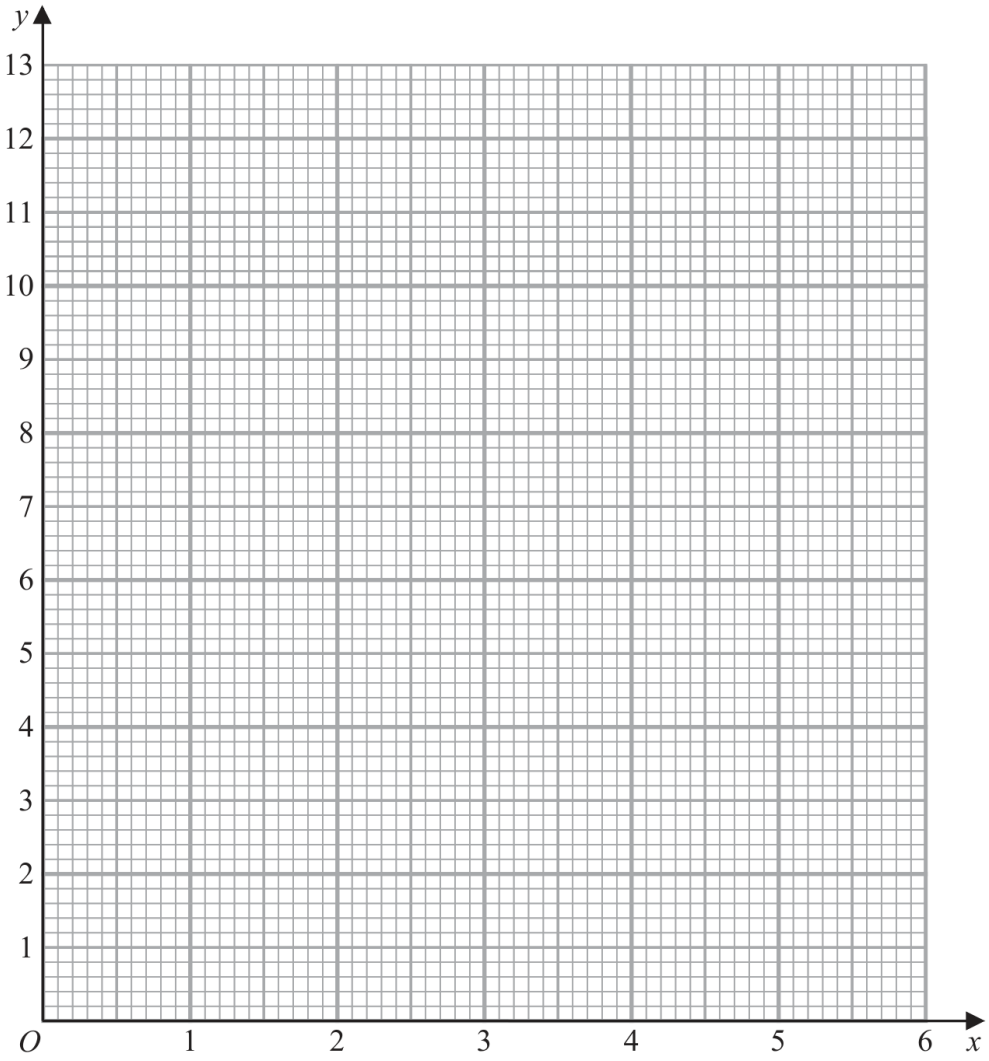
4 marks

11 (a) Complete the table of values for $y = 2\left(x + \frac{1}{x}\right)$

x	0.5	1	2	3	4	5	6
y			5	6.7			12.3

(2)

(b) On the grid, draw the graph of $y = 2\left(x + \frac{1}{x}\right)$ for $0.5 \leqslant x \leqslant 6$



(2)

Worked solution 08

Complete a function table / Draw the function graph

MODULAR UNIT 1
4 marks

M01 – Complete a function table

Use the displayed formula

$$y = 2(x + 1/x).$$

Substitute the four missing x-values

$$y(0.5) = 5,\ y(1) = 4,\ y(4) = 8.5,\ y(5) = 10.4.$$

Final answer

Missing values: 5, 4, 8.5, 10.4

M02 – Draw the function graph

Plot the table

Plot the seven table points for $0.5 \leq x \leq 6$.

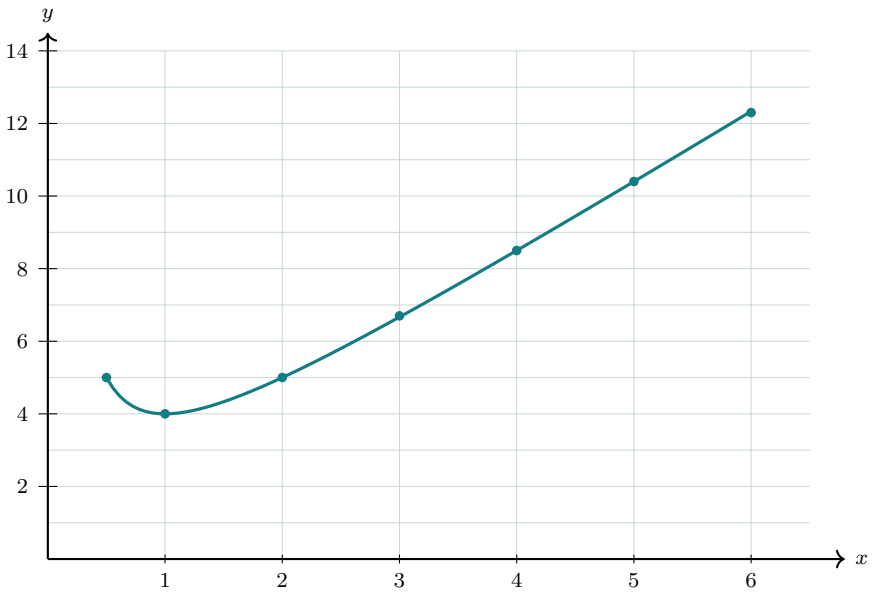
Join smoothly

Join the points with the correct smooth curve on the given grid.

Final answer

The correct smooth curve through the table points

Completed solution diagram: Smooth curve through the table points



Original question 09

4MA1-1H Q12 M01

MODULAR UNIT 1

4 marks

12 ABC is a right-angled triangle.
D is a point on BC

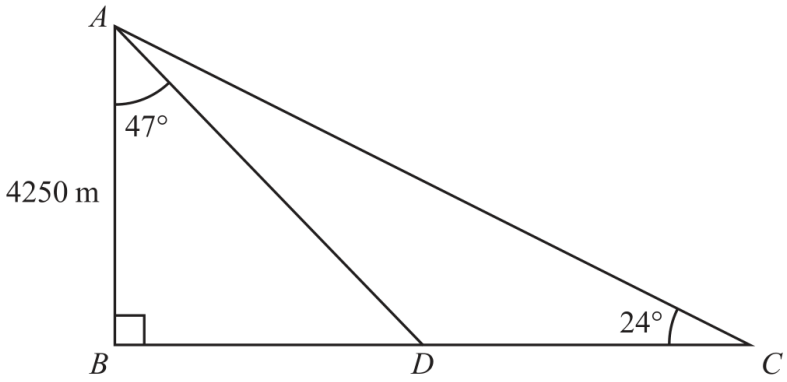


Diagram **NOT** accurately drawn

$AB = 4250$ m angle $BAD = 47°$ angle $BCA = 24°$

Work out the length of DC
Give your answer correct to the nearest integer.

..... m

Worked solution 09

Find DC using trigonometry

MODULAR UNIT 1
4 marks

M01 – Find DC using trigonometry

Find BD

$$BD = 4250 \tan 47^\circ = 4557.567\ldots.$$

Find BC

$$BC = 4250/\tan 24^\circ = 9545.656\ldots.$$

Subtract

$$DC = BC - BD = 4988.089\ldots \text{ m}.$$

Round

$$DC = 4988 \text{ m}.$$

Final answer

4988 m

Original question 10

4MA1-1H Q13 M01, M02

MODULAR UNIT 1

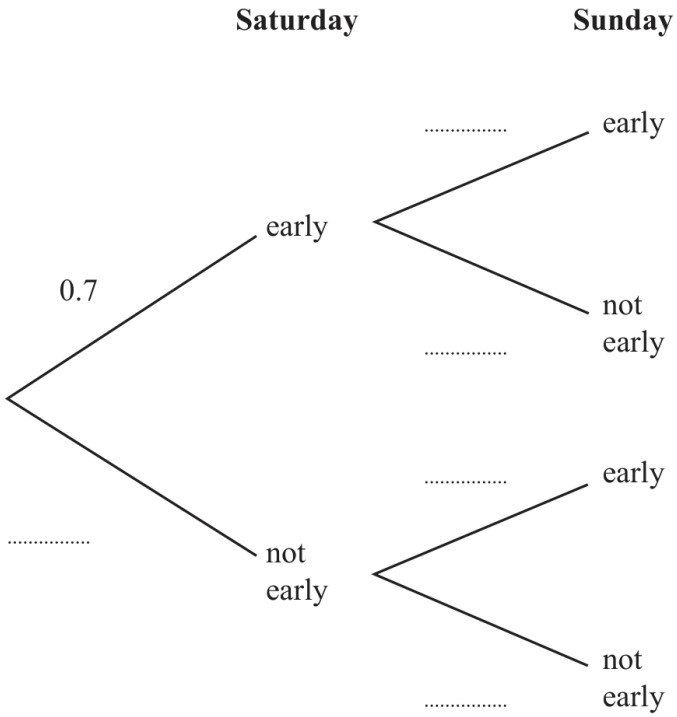
4 marks

13 The probability that Thomas gets to work early on Saturday is 0.7

If Thomas gets to work early on Saturday, the probability that he will get to work early on Sunday is 0.9

If Thomas does **not** get to work early on Saturday, the probability that he will get to work early on Sunday is 0.6

(a) Use this information to complete the probability tree diagram.



(2)

(b) Work out the probability that Thomas gets to work early on both Saturday and Sunday.

.....

(2)

Worked solution 10

Complete a conditional probability tree / Probability of being early both days

MODULAR UNIT 1
4 marks

M01 – Complete a conditional probability tree

Complete Saturday branches

$$P(early) = 0.7, \quad P(not\ early) = 0.3.$$

Complete Sunday branches

After early: 0.9 and 0.1; after not early: 0.6 and 0.4.

Final answer

Branches: 0.7/0.3, then 0.9/0.1 and 0.6/0.4

M02 – Probability of being early both days

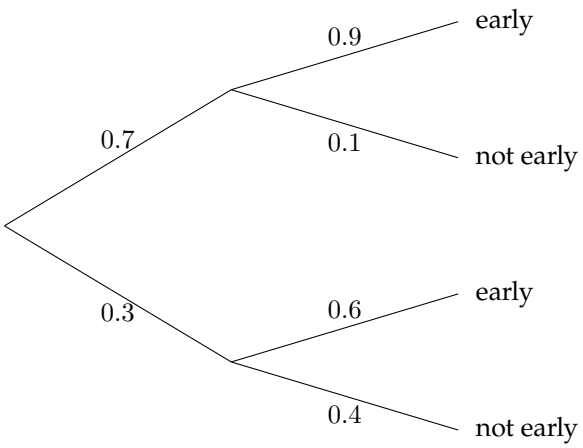
Multiply along the early path

$$P(early\ Saturday\ and\ early\ Sunday) = 0.7 \times 0.9 = 0.63.$$

Final answer

0.63

Completed solution diagram: Completed conditional probability tree



Original question 11

4MA1-1H Q15 M01

MODULAR UNIT 1

3 marks

15 Write $3x(2x-1)(5x+4)$ in the form $ax^3 + bx^2 + cx$ where a, b and c are integers.

.....

Worked solution 11

Expand three factors

MODULAR UNIT 1

3 marks

M01 – Expand three factors

Expand the two brackets

$$(2x-1)(5x+4) = 10x^2 + 3x - 4.$$

Multiply by 3x

$$3x(10x^2 + 3x - 4) = 30x^3 + 9x^2 - 12x.$$

Read a,b,c

$$a = 30,\ b = 9,\ c = -12.$$

Final answer

$$30x^3 + 9x^2 - 12x$$

Original question 12

4MA1-1H Q16 M01

MODULAR UNIT 1

4 marks

16 $OAPB$ is a sector of a circle, centre O

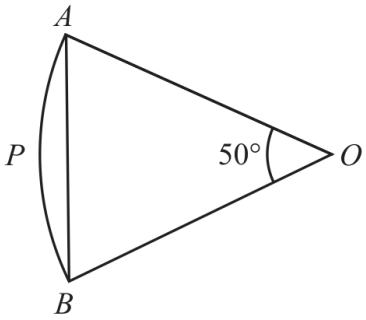


Diagram **NOT** accurately drawn

Angle $AOB = 50°$

Area of triangle $OAB = 120\ \text{cm}^2$

Work out the area of the sector $OAPB$
Give your answer correct to 3 significant figures.

..... cm^2

Worked solution 12

Find the area of a sector

MODULAR UNIT 1

4 marks

M01 – Find the area of a sector

Use the triangle area

$$120 = \tfrac{1}{2} r^2 \sin 50^\circ \Rightarrow r^2 = 240/\sin 50^\circ.$$

Find r

$$r = 17.7002\ldots.$$

Use the sector fraction

$$A = \frac{50}{360}\pi r^2 = 136.7\ldots.$$

Round

$$A = 137\,\text{cm}^2 \ (3\ \text{s.f.}).$$

Final answer

$$137\,\text{cm}^2$$

Original question 13

4MA1-1H Q17 M01

MODULAR UNIT 1

1 marks

17 (a) Express $\sqrt{675}$ in the form $n\sqrt{27}$ where n is a positive integer.

.....

(1)

Worked solution 13

Express a surd in the required form

MODULAR UNIT 1

1 marks

M01 – Express a surd in the required form

Factor inside the root

$$\sqrt{675} = \sqrt{25 \times 27} = 5\sqrt{27}.$$

Final answer

$$n = 5$$

Original question 14

4MA1-1H Q17 M02

MODULAR UNIT 1

3 marks

(b) Show that $\dfrac{5-\sqrt{2}}{\sqrt{2}-1}$ can be written in the form $a+b\sqrt{2}$ where a and b are integers.

(3)

Worked solution 14

Rationalise a surd denominator

MODULAR UNIT 1

3 marks

M02 – Rationalise a surd denominator

Multiply by the conjugate

$$\frac{5-\sqrt{2}}{\sqrt{2}-1}\times\frac{\sqrt{2}+1}{\sqrt{2}+1}.$$

Simplify

The denominator is 1 and the numerator is $(5-\sqrt{2})(\sqrt{2}+1)=4+4\sqrt{2}$.

Identify integers

$$a=4,\ b=4.$$

Final answer

$$4+4\sqrt{2}$$

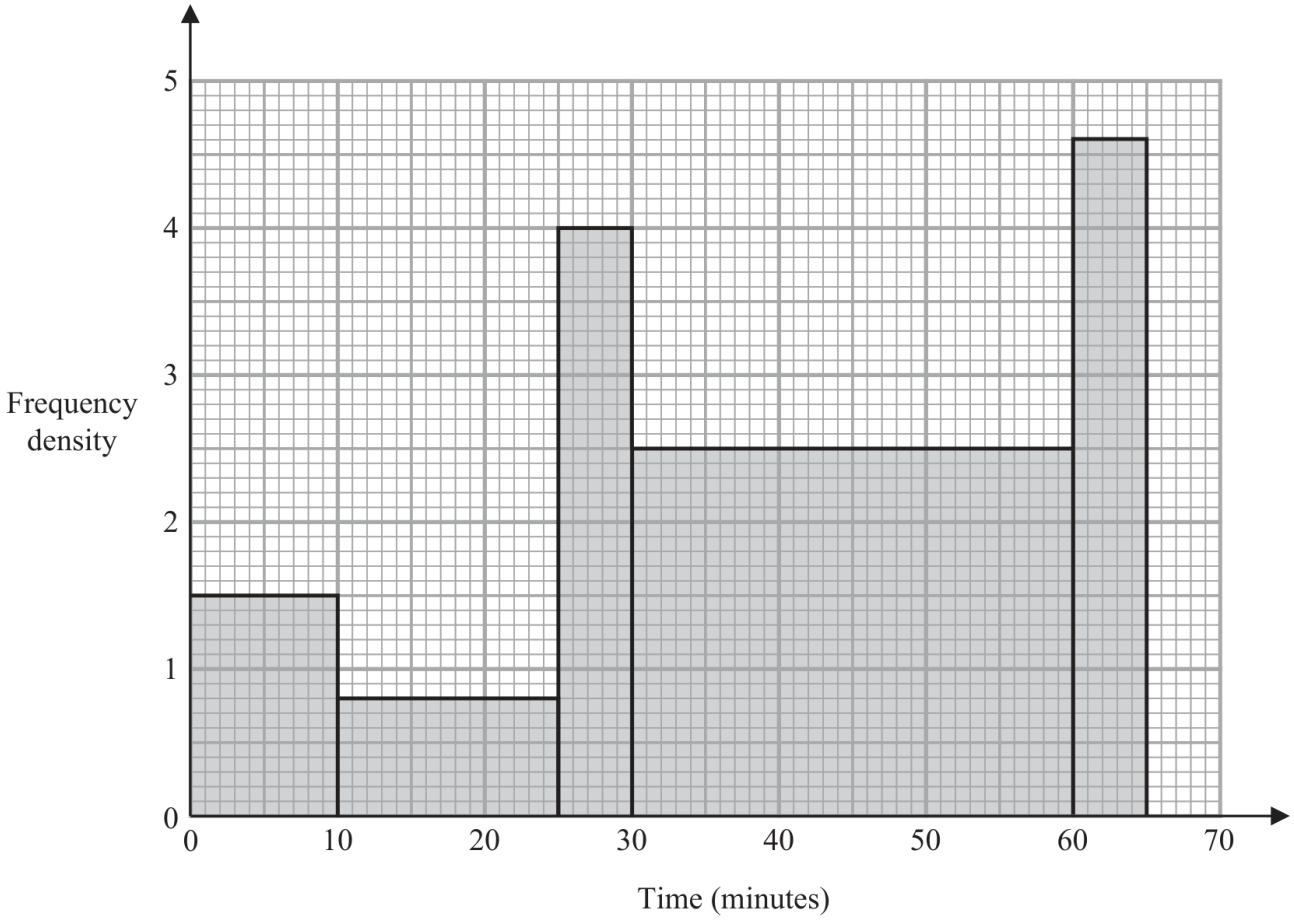
Original question 15

4MA1-1H Q18 M01

MODULAR UNIT 1

4 marks

18 The histogram shows information about the times some students took to complete a puzzle.



Work out an estimate for the fraction of these students who took between 20 minutes and 60 minutes to complete the puzzle.

.....

Worked solution 15

Estimate a histogram fraction

MODULAR UNIT 1
4 marks

M01 – Estimate a histogram fraction

Find the interval frequencies

Use frequency density× class width: the total frequency is 145.

Find the target frequency

Between 20 and 60 minutes: 20+75+4=99.

Form the fraction

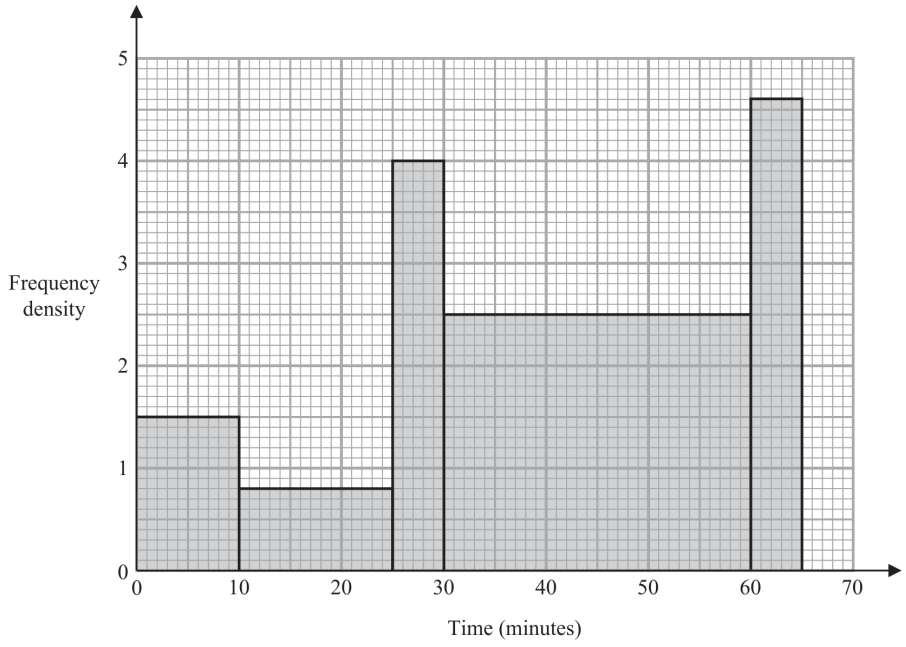
$$\text{fraction} = 99/145.$$

Final answer

$$\frac{99}{145}$$

Completed solution diagram: Histogram-area calculation on the exact source scale

18 The histogram shows information about the times some students took to complete a puzzle.



Work out an estimate for the fraction of these students who took between 20 minutes and 60 minutes to complete the puzzle.

.....

Target classes from 20 to 60 minutes: $20 + 75 + 4 = 99$**; total frequency** 145**.**

Original question 16

4MA1-1H Q21 M01

MODULAR UNIT 1

3 marks

21 $T = \dfrac{x^2 + y^2}{w}$

$x = 28.4$ correct to 1 decimal place.

$y = 17$ correct to 2 significant figures.

$w = 90$ correct to the nearest 5

Calculate the upper bound for the value of T

Give your answer correct to 3 significant figures.
Show your working clearly.

.....

Worked solution 16

Use upper and lower bounds

MODULAR UNIT 1

3 marks

M01 – Use upper and lower bounds

Write the bounds

$$UB(x) = 28.45,\ UB(y) = 17.5,\ LB(w) = 87.5.$$

Substitute

$$UB(T) = \frac{28.45^2 + 17.5^2}{87.5} = 12.7503\ldots.$$

Round

$$UB(T) = 12.8\ (3\text{ s.f.}).$$

Final answer

12.8

Original question 17

4MA1-2H Q1 M01

MODULAR UNIT 1

3 marks

1 Show that $1\frac{5}{7} \times 2\frac{3}{16} = 3\frac{3}{4}$

Worked solution 17

Show the mixed-number product

MODULAR UNIT 1
3 marks

M01 – Show the mixed-number product

Convert to improper fractions

$$1\frac{5}{7} = 12/7, \quad 2\frac{3}{16} = 35/16.$$

Multiply and cancel

$$\frac{12}{7} \times \frac{35}{16} = \frac{3 \times 5}{4} = \frac{15}{4}.$$

Convert to a mixed number

$$\frac{15}{4} = 3\frac{3}{4}.$$

Final answer

$$3\frac{3}{4}$$

Original question 18

4MA1-2H Q2 M01

MODULAR UNIT 1

1 marks

2 The length of a table is measured as 1.4 metres correct to one decimal place.

(a) Write down the upper bound of the length of the table.

..... metres

(1)

Worked solution 18

Upper bound of a measured length

MODULAR UNIT 1

1 marks

M01 – Upper bound of a measured length

Use half the rounding unit

1.4 m correct to 1 decimal place gives $1.35 \leq L < 1.45$.

Read the upper bound

$$UB = 1.45 \text{ m}.$$

Final answer

1.45 m

Original question 19

4MA1-2H Q2 M02

MODULAR UNIT 1

1 marks

2 The length of a table is measured as 1.4 metres correct to one decimal place.

(b) Write down the lower bound of the length of the table.

..... metres

(1)

Worked solution 19

Lower bound of a measured length

MODULAR UNIT 1

1 marks

M02 – Lower bound of a measured length

Use half the rounding unit

$$1.35 \leq L < 1.45.$$

Read the lower bound

$$LB = 1.35\ \text{m}.$$

Final answer

1.35 m

Original question 20

4MA1-2H Q3 M01

MODULAR UNIT 1

3 marks

3 The diagram shows triangle PQR

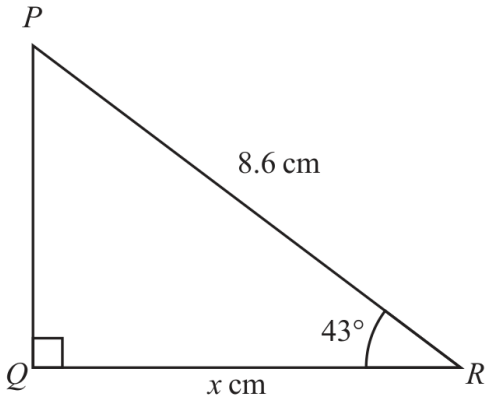


Diagram **NOT** accurately drawn

Work out the value of x
Give your answer correct to one decimal place.

$x =$ .....

Worked solution 20

Use cosine in a triangle

MODULAR UNIT 1
3 marks

M01 – Use cosine in a triangle

Choose the ratio

$$\cos 43^\circ = x/8.6.$$

Rearrange

$$x = 8.6 \cos 43^\circ = 6.300\ldots.$$

Round

$$x = 6.3 \text{ cm}.$$

Final answer

6.3 cm

Original question 21

4MA1-2H Q5 M01

MODULAR UNIT 1

4 marks

5 Cody has a biased 5-sided spinner, numbered 1, 2, 3, 4, 5

The table gives the probabilities that when the spinner is spun it will land on 2 or on 3 or on 5

Number	1	2	3	4	5
Probability		0.14	0.17		0.21

The probability that the spinner will land on 1 is the same as the probability that the spinner will land on 4

Cody is going to spin the spinner 400 times.

Work out an estimate for the number of times the spinner will land on 4

.....

Worked solution 21

Estimate a spinner frequency

MODULAR UNIT 1

4 marks

M01 – Estimate a spinner frequency

Use total probability

$$0.14 + 0.17 + 0.21 + x + x = 1 \Rightarrow 2x = 0.48.$$

Find the missing probability

$$x = 0.24.$$

Scale to 400 spins

$$400(0.24) = 96.$$

Final answer

96

Original question 22

4MA1-2H Q12 M01

MODULAR UNIT 1

3 marks

12 (a) Solve $\frac{3x+2}{5} - \frac{2x+1}{3} = x$

Show clear algebraic working.

$x =$ .....

(3)

Worked solution 22

Solve the fractional equation

MODULAR UNIT 1
3 marks

M01 – Solve the fractional equation

Clear denominators

$$3(3x+2)-5(2x+1)=15x.$$

Collect terms

$$9x+6-10x-5=15x \Rightarrow -x+1=15x.$$

Solve

$$x=1/16.$$

Final answer

$$x=\frac{1}{16}$$

Original question 23

4MA1-2H Q14 M01

MODULAR UNIT 1

3 marks

14 Given that $\frac{3^{2n+3}}{3^4} = 3^3 \times 3^{1-2n}$

find the value of n
Show your working clearly.

$n =$ .....

Worked solution 23

Solve an index equation

MODULAR UNIT 1
3 marks

M01 – Solve an index equation

Combine powers of 3

The left side has exponent 2n-1; the right side has exponent 4-2n.

Equate exponents

$$2n - 1 = 4 - 2n.$$

Solve

$$4n = 5 \Rightarrow n = 5/4.$$

Final answer

$$n = \frac{5}{4}$$

Original question 24

4MA1-2H Q15 M01

MODULAR UNIT 1

2 marks

15 Use algebra to show that $0.7\dot{6}\dot{3} = \frac{42}{55}$

Worked solution 24

Convert a recurring decimal to a fraction

MODULAR UNIT 1
2 marks

M01 – Convert a recurring decimal to a fraction

Shift and subtract

Let x=0.763 recurring; then 1000x-10x=763.63...-7.63...=756.

Solve

$$990x = 756 \Rightarrow x = 756/990 = 42/55.$$

Final answer

$$0.7\overline{63} = \frac{42}{55}$$

Original question 25

4MA1-2H Q18 M01

MODULAR UNIT 1

4 marks

18 The straight line **L** is perpendicular to the straight line with equation $2x + y = 9$ and passes through the point with coordinates (8, 11)

Find an equation for **L**
Give your answer in the form $y = mx + c$

.....

Worked solution 25

Find a perpendicular line

MODULAR UNIT 1
4 marks

M01 – Find a perpendicular line

Read the original gradient

2x+y=9⇒ y=-2x+9, so m=-2.

Use the negative reciprocal

$$m_{\perp} = 1/2.$$

Use (8,11)

$$11 = \tfrac{1}{2}(8) + c \Rightarrow c = 7.$$

State the line

$$y = \tfrac{1}{2}x + 7.$$

Final answer

$$y = \frac{1}{2}x + 7$$

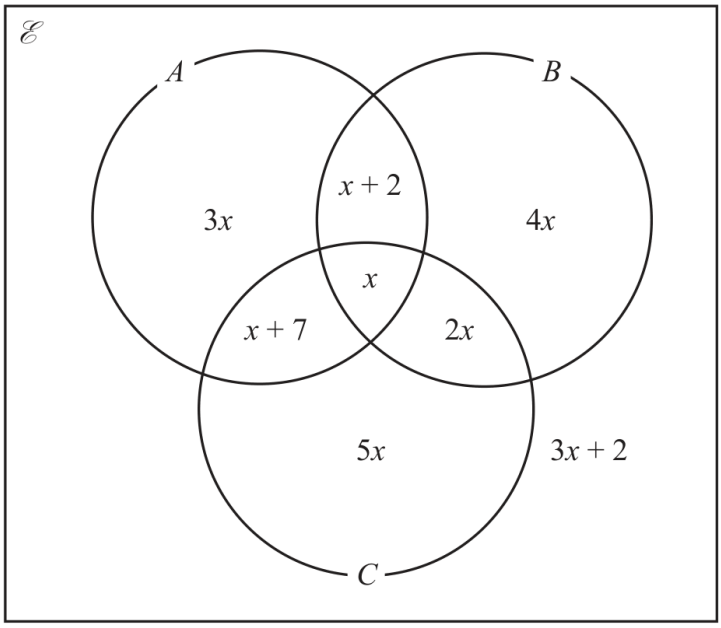
Original question 26

4MA1-2H Q21 M01

MODULAR UNIT 1

4 marks

21 The Venn diagram shows information about the numbers of items in set A, set B and set C, where x is an integer.



Given that $\mathrm{n}(A \cup B)' = 26$

find $\mathrm{n}(A' \cap C)$

$\mathrm{n}(A' \cap C) =$ .....

Worked solution 26

Use a three-set Venn diagram

MODULAR UNIT 1

4 marks

M01 – Use a three-set Venn diagram

Use the complement of the union

$$n((A \cup B)') = 5x + (3x + 2) = 26 \Rightarrow 8x = 24 \Rightarrow x = 3.$$

Select the requested regions

$$n(A' \cap C) = 5x + 2x = 7x.$$

Substitute

$$7(3) = 21.$$

Final answer

21

Original question 27

4MA1-2H Q23 M01

MODULAR UNIT 1

4 marks

23 Show that $\dfrac{16x^2 - 36}{x - 7} \div \dfrac{2x^2 + 7x + 6}{x^2 - 5x - 14} - (7 + 8x) = n$

where n is an integer to be found.
Show clear algebraic working.

Worked solution 27

Simplify an algebraic fraction

MODULAR UNIT 1
4 marks

M01 – Simplify an algebraic fraction

Factorise the first numerator

$$16x^2 - 36 = 4(2x - 3)(2x + 3).$$

Factorise the remaining terms

$$2x^2 + 7x + 6 = (2x + 3)(x + 2), \quad x^2 - 5x - 14 = (x - 7)(x + 2).$$

Cancel

The quotient simplifies to $4(2x-3)$.

Subtract the linear expression

$4(2x-3)-(7+8x)=-19$, so $n=-19$.

Final answer

$$n = -19$$

Original question 28

4MA1-2H Q25 M01

MODULAR UNIT 1

5 marks

25 The diagram shows an equilateral triangle ABC and a circle with centre O

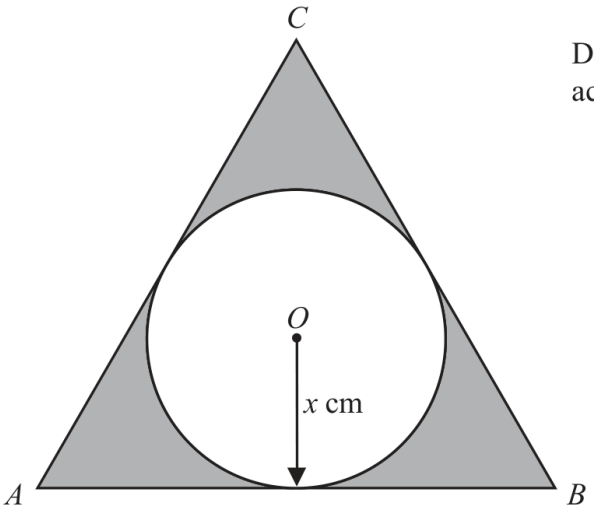


Diagram **NOT** accurately drawn

AB, BC and CA are tangents to the circle.

The radius of the circle is x cm

The total area, in cm^2, of the regions shown shaded in the diagram is nx^2

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

Original question 28 (continued)

4MA1-2H Q25 M01

MODULAR UNIT 1

5 marks

$n =$ .....

Worked solution 28

Area of shaded regions in an equilateral triangle

MODULAR UNIT 1
5 marks

M01 – Area of shaded regions in an equilateral triangle

Find the side length

The inradius is x, so the side is $2\sqrt{3}$x.

Find triangle area

$$A_{triangle} = \tfrac{1}{2}(2\sqrt{3}x)(3x) = 3\sqrt{3}x^2.$$

Subtract the circle

$$A_{shaded} = (3\sqrt{3} - \pi)x^2.$$

Read n

$$n = 3\sqrt{3} - \pi = 2.0548\ldots.$$

Round

$$n = 2.05 \text{ (3 s.f.)}.$$

Final answer

2.05