



GuideMyGrades

— YOUR GOALS. OUR EXPERTISE. —

EDEXCEL GCSE (9-1) MATHS: QUESTIONS BY TOPIC

Number Operations & Properties (N1)

GCSE (9-1) Mathematics (1MA1) · Higher tier

42 questions · 108 marks · Mark schemes included

Past papers June 2017 - June 2025 · 4 sub-topics

 guidemygrades.com

 [@Guidemygrades](https://www.instagram.com/Guidemygrades)

 [@Guidemygrades](https://twitter.com/Guidemygrades)

 [@Guidemygrades](https://www.youtube.com/Guidemygrades)

 info@guidemygrades.com

 Piccadilly Business Centre, Unit C, Aldow Enterprise Park
Blackett Street, Manchester, M12 6AE

HOW TO USE THIS BOOKLET

Questions are grouped by sub-topic and run from the lowest to the highest mark tariff, then oldest paper first.

Click any row below to jump straight to that sub-topic or question.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme; < QUESTION brings you back.

A gold bar in the left margin marks exactly where the question sits on the original page.

Diagrams, graphs, grids and tables are printed exactly as they appear in the original papers.

Each question is filed under its main topic; longer questions may also test skills from other topics.

QUESTION	SOURCE	MARKS	PAGE
N1a PLACE VALUE, ORDERING & THE FOUR OPERATIONS		4 Qs · 11 marks	3
1. Q1	GCSE Paper 2H November 2024	2	4
2. Q3	GCSE Paper 1H June 2017	3	5
3. Q8	GCSE Paper 2H November 2017	3	6
4. Q1	GCSE Paper 2H June 2023	3	7
N1b FACTORS, MULTIPLES & PRIMES		20 Qs · 54 marks	8
5. Q20	GCSE Paper 3H November 2020	1	9
6. Q2	GCSE Paper 1H June 2017	2	10
7. Q1	GCSE Paper 1H November 2017	2	11
8. Q3	GCSE Paper 1H June 2019	2	12
9. Q2	GCSE Paper 1H June 2022	2	13
10. Q8	GCSE Paper 1H November 2022	2	14
11. Q2	GCSE Paper 2H June 2023	2	15
12. Q1	GCSE Paper 3H June 2024	2	16
13. Q1	GCSE Paper 1H June 2025	2	17
14. Q2	GCSE Paper 2H June 2018	3	18
15. Q10	GCSE Paper 3H June 2018	3	19
16. Q1	GCSE Paper 1H November 2019	3	20
17. Q1	GCSE Paper 1H November 2022	3	21
18. Q5	GCSE Paper 3H June 2023	3	22
19. Q5	GCSE Paper 3H November 2023	3	23
20. Q2	GCSE Paper 2H June 2024	3	24
21. Q1	GCSE Paper 2H November 2020	4	25
22. Q2	GCSE Paper 2H November 2021	4	26
23. Q3	GCSE Paper 1H November 2023	4	27
24. Q1	GCSE Paper 2H June 2025	4	28
N1c COUNTING & SYSTEMATIC LISTING		16 Qs · 38 marks	29
25. Q11	GCSE Paper 3H June 2017	2	30
26. Q14	GCSE Paper 3H June 2018	2	31
27. Q14	GCSE Paper 2H November 2019	2	32
28. Q11	GCSE Paper 2H November 2020	2	33
29. Q13	GCSE Paper 2H November 2021	2	34
30. Q11	GCSE Paper 3H June 2022	2	35
31. Q11	GCSE Paper 3H November 2022	2	36
32. Q15	GCSE Paper 3H November 2022	2	37



QUESTION	SOURCE	MARKS	PAGE
33. Q19	GCSE Paper 1H June 2023	2	38
34. Q13	GCSE Paper 3H June 2024	2	39
35. Q14	GCSE Paper 2H November 2024	2	40
36. Q15	GCSE Paper 2H November 2017	3	41
37. Q11	GCSE Paper 2H November 2018	3	42
38. Q16	GCSE Paper 3H November 2023	3	43
39. Q14	GCSE Paper 2H June 2025	3	44
40. Q16	GCSE Paper 1H June 2019	4	45
N1d	SETS & VENN DIAGRAMS (SET NOTATION)	2 Qs · 5 marks	46
41. Q4	GCSE Paper 2H November 2024	2	47
42. Q2	GCSE Paper 1H November 2021	3	48



QUESTIONS

42 questions · 108 marks · 4 sub-topics

SUB-TOPIC N1a

PLACE VALUE, ORDERING & THE FOUR OPERATIONS

Sub-topic N1a · 4 questions · 11 marks · lowest tariff first



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Use your calculator to work out the value of

$$\sqrt{\frac{208.3 - 15.7}{5.694 + 1.8^2}}$$

Write down all the digits on your calculator display.

(Total for Question 1 is 2 marks)



3 Work out 54.6×4.3

(Total for Question 3 is 3 marks)



8 Use your calculator to work out $\sqrt{\frac{\sin 25^\circ + \sin 40^\circ}{\cos 25^\circ - \cos 40^\circ}}$

(a) Write down all the figures on your calculator display.

.....
(2)

(b) Write your answer to part (a) correct to 2 decimal places.

.....
(1)

(Total for Question 8 is 3 marks)

9 Yesterday it took 5 cleaners $4\frac{1}{2}$ hours to clean all the rooms in a hotel.

There are only 3 cleaners to clean all the rooms in the hotel today.

Each cleaner is paid £8.20 for each hour or part of an hour they work.

How much will each cleaner be paid today?

£

(Total for Question 9 is 3 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Work out the value of $\frac{25 - \sqrt{43.87}}{6 + 2.1^2}$

Write down all the figures on your calculator display.

.....
(2)

(b) Work out the value of the reciprocal of 0.625

.....
(1)

(Total for Question 1 is 3 marks)



SUB-TOPIC N1b

FACTORS, MULTIPLES & PRIMES

Sub-topic N1b · 20 questions · 54 marks · lowest tariff first



20 Here is a list of five numbers.

98^{53}

98^{64}

98^{73}

98^{88}

98^{91}

Find the lowest common multiple of these five numbers.

(Total for Question 20 is 1 mark)



On the same day, in another British town, the maximum temperature was 16.4°C .

(c) Estimate the number of hours of sunshine in this town on this day.

..... hours
(2)

A weatherman says,

“Temperatures are higher on days when there is more sunshine.”

(d) Does the scatter graph support what the weatherman says?
Give a reason for your answer.

.....
.....
(1)

(Total for Question 1 is 5 marks)

2 Express 56 as the product of its prime factors.

.....
(Total for Question 2 is 2 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Write 36 as a product of its prime factors.

(Total for Question 1 is 2 marks)



3 Find the highest common factor (HCF) of 72 and 90

(Total for Question 3 is 2 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Solve $7x - 27 < 8$

.....
(Total for Question 1 is 2 marks)

2 Write 124 as a product of its prime factors.

.....
(Total for Question 2 is 2 marks)



- 8 Two numbers m and n are such that
 m is a multiple of 5
 n is an even number
the highest common factor (HCF) of m and n is 7

Write down a possible value for m and a possible value for n .

$m =$

$n =$

(Total for Question 8 is 2 marks)



- 2 Write 60 as a product of its prime factors.

(Total for Question 2 is 2 marks)

- 3 There are 48 counters in a bag.
There are only red counters and blue counters in the bag.

$$\text{number of red counters} : \text{number of blue counters} = 1 : 2$$

Helen has to work out how many red counters are in the bag.

She says,

“There are 24 red counters in the bag because 1 is half of 2 and 24 is half of 48”

Is Helen correct?

You must give a reason for your answer.

(Total for Question 3 is 1 mark)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Find the highest common factor (HCF) of 63 and 105

(Total for Question 1 is 2 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Find the highest common factor (HCF) of 54 and 120

.....
(Total for Question 1 is 2 marks)



- 2 (a) Find the lowest common multiple (LCM) of 40 and 56

.....
(2)

$$A = 2^3 \times 3 \times 5$$

$$B = 2^2 \times 3 \times 5^2$$

- (b) Write down the highest common factor (HCF) of A and B .

.....
(1)

(Total for Question 2 is 3 marks)



10 Here are three lamps.

lamp A



lamp B



lamp C



Lamp A flashes every 20 seconds.

Lamp B flashes every 45 seconds.

Lamp C flashes every 120 seconds.

The three lamps start flashing at the same time.

How many times in one hour will the three lamps flash at the same time?

(Total for Question 10 is 3 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Find the Lowest Common Multiple (LCM) of 108 and 120

(Total for Question 1 is 3 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Write 500 as a product of powers of its prime factors.

.....
(Total for Question 1 is 3 marks)



5 A and B are numbers such that

$$A = 2^2 \times 3^4 \times 7$$

$$B = 3^2 \times 7^2$$

(a) Find the highest common factor (HCF) of A and B .

.....
(1)

(b) Find the lowest common multiple (LCM) of A and B .

.....
(2)

(Total for Question 5 is 3 marks)



- 5 Ali buys packs of balloons and boxes of pencils.

There are 30 balloons in each pack.

There are 24 pencils in each box.

Ali buys exactly the same number of balloons and pencils.

Work out how many packs of balloons and how many boxes of pencils she could have bought.

You must show all your working.

..... packs of balloons

..... boxes of pencils

(Total for Question 5 is 3 marks)

- 6 A company orders a large number of plates from a factory.

It would take 30 hours to make all the plates using 4 machines.

How many machines are needed to make all the plates in 6 hours?

.....
(Total for Question 6 is 2 marks)



- 2 (a) Write 90 as a product of its prime factors.

.....
(2)

$$A = 2^2 \times 3$$

$$B = 2 \times 3^2$$

- (b) Write down the lowest common multiple (LCM) of A and B .

.....
(1)

(Total for Question 2 is 3 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** (a) Write 84 as a product of its prime factors.

.....
(2)

- (b) Find the lowest common multiple (LCM) of 60 and 84

.....
(2)

(Total for Question 1 is 4 marks)



2 (a) Find the Highest Common Factor (HCF) of 60 and 84

.....
(2)

(b) Find the Lowest Common Multiple (LCM) of 24 and 40

.....
(2)

(Total for Question 2 is 4 marks)



3 (a) Write 156 as a product of its prime factors.

.....
(2)

(b) Find the highest common factor (HCF) of 156 and 130

.....
(2)

.....
(Total for Question 3 is 4 marks)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** (a) Express 250 as a product of its prime factors.

.....
(2)

- (b) Find the lowest common multiple (LCM) of 30 and 25

.....
(2)

(Total for Question 1 is 4 marks)



SUB-TOPIC N1c

COUNTING & SYSTEMATIC LISTING

Sub-topic N1c · 16 questions · 38 marks · lowest tariff first



- 11 Jeff is choosing a shrub and a rose tree for his garden.

At the garden centre there are 17 different types of shrubs and some rose trees.

Jeff says,

“There are 215 different ways to choose one shrub and one rose tree.”

Could Jeff be correct?

You must show how you get your answer.

(Total for Question 11 is 2 marks)

- 12 The points A , B , C and D lie in order on a straight line.

$$AB:BD = 1:5$$

$$AC:CD = 7:11$$

Work out $AB:BC:CD$

..... : :

(Total for Question 12 is 3 marks)



- 14** There are 16 hockey teams in a league.
Each team played two matches against each of the other teams.
Work out the total number of matches played.

.....

(Total for Question 14 is 2 marks)



14 Sadia is going to buy a new car.

For the car, she can choose one body colour, one roof colour and one wheel type.

She can choose from

19 different body colours

25 different wheel types

The total number of ways Sadia can choose the body colour and the roof colour and the wheel type is 3325

Work out the number of different roof colours that Sadia can choose from.

(Total for Question 14 is 2 marks)

15 Expand and simplify $(3x + 2)(2x + 1)(x - 5)$

(Total for Question 15 is 3 marks)



10 (a) Simplify $\left(\frac{1}{m^2}\right)^0$

.....
(1)

(b) Simplify $\frac{8(x-4)}{(x-4)^2}$

.....
(1)

(c) Simplify $(3n^4w^2)^3$

.....
(2)

(Total for Question 10 is 4 marks)

11 Jack is in a restaurant.

There are 5 starters, 8 main courses and some desserts on the menu.

Jack is going to choose one starter, one main course and one dessert.

He says there are 240 ways that he can choose his starter, his main course and his dessert.

Could Jack be correct?

You must show how you get your answer.

(Total for Question 11 is 2 marks)



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

(Total for Question 12 is 3 marks)

13 In a school there are 16 teachers and 220 students.
Of these students 120 are girls and 100 are boys.

One teacher, one girl and one boy are going to be chosen to represent the school.

Work out the number of different ways there are to choose one teacher, one girl and one boy.

(Total for Question 13 is 2 marks)



- 11 Rayheem has
16 shirts
5 pairs of jeans
3 jackets

Rayheem chooses an outfit to wear.

An outfit is 1 shirt, 1 pair of jeans and 1 jacket.

Work out how many different outfits Rayheem can choose.

.....
(Total for Question 11 is 2 marks)



10 Peter has to subtract $(x^2 - 2x - 4)$ from $(x^2 + 3x + 5)$

Here is his working

$$\begin{aligned} & (x^2 + 3x + 5) - (x^2 - 2x - 4) \\ &= x^2 + 3x + 5 - x^2 - 2x - 4 \\ &= x + 1 \end{aligned}$$

Explain what is wrong with Peter's working.

.....

.....

.....

(Total for Question 10 is 1 mark)

11 x and y are integers such that

$$\begin{aligned} & 3 < x < 8 \\ & 4 < y < 10 \\ & \text{and } x + y = 14 \end{aligned}$$

Find all the possible values of x .

.....

(Total for Question 11 is 2 marks)

12 Martin used his calculator to work out the value of a number P .
He wrote down the first two digits of the answer on his calculator.

He wrote down 1.2

Complete the error interval for P .

$$\dots \leq P < \dots$$

(Total for Question 12 is 2 marks)



15 A pet shop has

7 guppy fish

13 tetra fish

5 angel fish.

David is going to choose one of the following combinations of fish

a guppy fish and an angel fish

or a tetra fish and an angel fish

or a guppy fish, a tetra fish and an angel fish.

Show that there are 555 different ways for David to choose his fish.

(Total for Question 15 is 2 marks)



19 The menu in a restaurant has starters, main courses and desserts.

There are 5 starters.

There are 12 main courses.

There are x desserts.

There are 420 different ways to choose one starter, one main course and one dessert.

Work out the value of x .

$x =$

(Total for Question 19 is 2 marks)



- 13** There are 30 students in a class.
A teacher is going to choose at random 2 of the students.

Work out the number of different pairs of students that the teacher can choose.

.....
(Total for Question 13 is 2 marks)

- 14** At the start of 2022 Kim invested some money in a savings account.
The account paid 3.5% compound interest each year.

At the end of 2022

interest was added to the account then Kim took £750 from the account.

At the end of 2023

interest was added to the account then Kim took £1000 from the account.

There was then £2937.14 in the account.

Work out how much money Kim invested at the start of 2022
You must show all your working.

£.....

(Total for Question 14 is 4 marks)



- 14 There are 10 football teams in a league.
Each team plays every other team 4 times.
Work out the total number of games played.

(Total for Question 14 is 2 marks)



- 15** Tracey is going to choose a main course and a dessert in a cafe.
She can choose from 8 main courses and 7 desserts.

Tracey says that to work out the number of different ways of choosing a main course and a dessert you add 8 and 7

- (a) Is Tracey correct?
You must give a reason for your answer.

(1)

12 teams play in a competition.
Each team plays each other team exactly once.

- (b) Work out the total number of games played.

(2)

(Total for Question 15 is 3 marks)

- 16** Solve $(x - 2)^2 = 3$

Give your solutions correct to 3 significant figures.

(Total for Question 16 is 2 marks)



11 In a restaurant there are

9 starter dishes

15 main dishes

8 dessert dishes

Janet is going to choose one of the following combinations for her meal.

a starter dish and a main dish

or a main dish and a dessert dish

or a starter dish, a main dish and a dessert dish

Show that there are 1335 different ways to choose the meal.

(Total for Question 11 is 3 marks)



16 Zia has to set a 4-digit security passcode on her phone.

Each digit of the passcode is a number from 1 to 9
She can use each number more than once.

Zia tells her friend Amber that

- the first digit is a cube number
- the second digit is a prime number
- the third digit is greater than 6
- the fourth digit is an odd number.

The diagram shows one possible 4-digit passcode.



Amber is going to have one attempt at guessing Zia's passcode.

Work out the probability that Amber guesses Zia's passcode on the first attempt.

(Total for Question 16 is 3 marks)

- 14 There are 15 dogs in a dog show.
One dog is awarded first prize.
A different dog is awarded second prize.

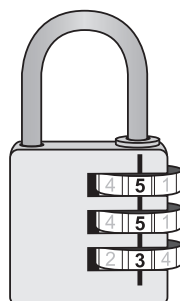
There are 12 cats in a cat show.
One cat is awarded first prize.
A different cat is awarded second prize.

Work out how many different ways these four prizes can be awarded.

(Total for Question 14 is 3 marks)



- 16 There are three dials on a combination lock.
Each dial can be set to one of the numbers 1, 2, 3, 4, 5
The three digit number 553 is one way the dials can be set, as shown in the diagram.



- (a) Work out the number of different three digit numbers that can be set for the combination lock.

.....
(2)

- (b) How many of the possible three digit numbers have three different digits?

.....
(2)

(Total for Question 16 is 4 marks)

SUB-TOPIC N1d

SETS & VENN DIAGRAMS (SET NOTATION)

Sub-topic N1d · 2 questions · 5 marks · lowest tariff first

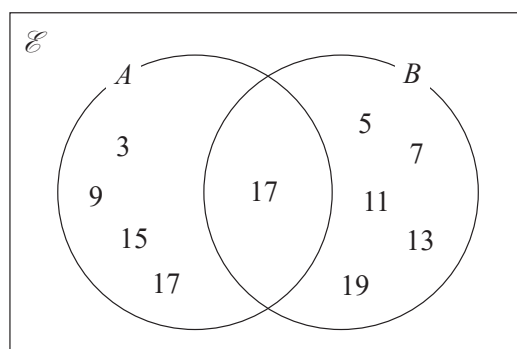


4 $\mathcal{E} = \{\text{odd numbers between 0 and 20}\}$

$$A = \{3, 9, 15, 17\}$$

$$B = \{5, 7, 11, 13, 17, 19\}$$

Tom was asked to draw a Venn diagram for this information.
Here is his answer.



Write down two things Tom should do to make his answer fully correct.

1.....

.....

2.....

.....

(Total for Question 4 is 2 marks)

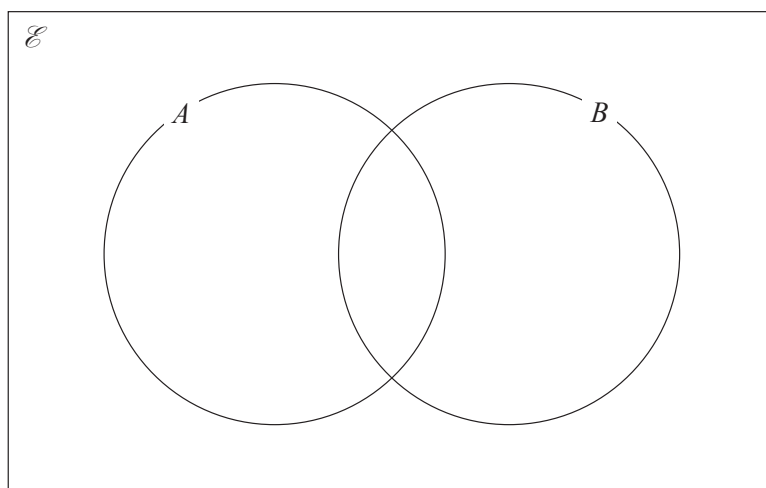


- 2 $\mathcal{E} = \{\text{even numbers less than 19}\}$

$$A = \{6, 12, 18\}$$

$$B = \{2, 6, 14, 18\}$$

Complete the Venn diagram for this information.



(Total for Question 2 is 3 marks)

- 3 Work out $4\frac{1}{5} - 2\frac{2}{3}$

Give your answer as a mixed number.

(Total for Question 3 is 3 marks)



MARK SCHEMES

official mark schemes, in the same order as the questions



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	4.643(069317)	M1 A1	for 192.6 or 8.934 or 21.558(09268) or answer of 4.64 or digits 4643... for 4.643(069317)	Answer must be given to at least 3 decimal places rounded or truncated Check first 3 decimal places only If given to 3 dp or better ignore subsequent rounding
2	(a) positive	C1	cao	Ignore any description of a relationship and any reference to strength of correlation
	(b) lobf drawn	C1	for straight line passing between (140, 20) and (140, 22.5) and between (220, 30) and (220, 32.5)	
	(c) 26.5 – 29.5	C1	for answer in range 26.5 – 29.5 or ft single line with positive gradient	

Paper: 1MA1/1H																																
Question	Working	Answer	Mark	Notes																												
1	(a)	10,19	B1	cao																												
	(b)	positive	C1	positive (correlation)																												
	(c)	12 to 13	M1	for an appropriate line of best fit drawn, or a point marked at (x, 16.4) or a horizontal line drawn from 16.4 across to (x, 16.4) where x is in the range 12 to 13																												
			A1	hours given in the range 12 to 13																												
	(d)	explanation	C1	(yes) e.g. as the majority of points for high temperature appear when there are more hours of sunshine (positive correlation)																												
2		2×2×2×7	M1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error																												
			A1	accept 2 ³ × 7																												
3	21840 1638 23478 <table><tr><td></td><td>5</td><td>4</td><td>6</td></tr><tr><td>2</td><td>2</td><td>0</td><td>1</td></tr><tr><td>3</td><td>1</td><td>5</td><td>2</td></tr><tr><td></td><td>4</td><td>7</td><td>8</td></tr></table> <table><tr><td></td><td>500</td><td>40</td><td>6</td></tr><tr><td>40</td><td>20000</td><td>1600</td><td>240</td></tr><tr><td>3</td><td>1500</td><td>120</td><td>18</td></tr></table> 20000 + 1600 + 240 + 1500 + 120 + 18 = 23478		5	4	6	2	2	0	1	3	1	5	2		4	7	8		500	40	6	40	20000	1600	240	3	1500	120	18	234.78	M1	for complete method with relative place value correct including addition of all the appropriate elements of the calculation e.g. two lines of 1 st method, internal numbers of grids, or complete structure shown of partitioning methods
	5	4	6																													
2	2	0	1																													
3	1	5	2																													
	4	7	8																													
	500	40	6																													
40	20000	1600	240																													
3	1500	120	18																													
			A1	for digits 23478																												
			A1	(ft dep M1) for correct placement of the decimal point into their final answer																												
4		x ² + 6x = 1	M1	writes the area using algebraic terms e.g. (x + 3) × (x + 3) or at least two correct area expressions which may be written on the diagram or x given as √10 – 3																												
			M1	expands and includes the given 10 e.g. x ² + 3x + 3x + 9 = 10; condone one error in the four terms when expanding or 10 – 3√10 – 3√10 + 9 + 6√10 – 18 (=1) condone 1 error in the 6 terms																												
			A1	rearranges to give the given equation or shows surd expression simplifies to 1																												

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
7		32.3	P1	for using Pythagoras to find length of third side of triangle, eg $7.5^2 - 6^2$ or $6^2 + x^2 = 7.5^2$ or uses trigonometry to find angle in triangle, eg $\sin A = \frac{6}{7.5}$ or $\cos B = \frac{6}{7.5}$
			P1	(dep P1) for complete process to find length of third side of triangle eg $\sqrt{7.5^2 - 6^2}$ or $\sqrt{56.25 - 36}$ or $\sqrt{20.25}$ (= 4.5) or uses trigonometry to find base length of triangle, eg $7.5 \times \cos "A"$ or $7.5 \times \sin "B"$ or $\frac{6}{\tan "A"}$
			P1	(dep P2) for $24 - 10 - "4.5"$ (= 9.5)
			P1	(indep) for process to find angle CDA , eg $\tan CDA = \frac{6}{\text{base}}$ from right- angled triangle
			A1	for answer in the range 32.2 to 32.3
8 (a)		2.7560...	M1	for 1.0654(059...), 0.1402(633...), 7.5957(541...), 2.756 truncated or rounded to no less than 2dp
			A1	for 2.7560(...)
(b)		2.76	B1	for 2.76 ft from (a)



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	1.765(2...)	M1	for fully evaluating the numerator or denominator, eg 18.3... or 10.4(1) or answer of 1.76 or 1.77 or digits 1765(2...)	Answer must be given to at least 3 decimal places rounded or truncated. Check first 4 significant figures only.
		A1	for 1.765(2.....)	
	(b) 1.6	B1	for 1.6 oe	
2	$2 \times 2 \times 3 \times 5$	M1	for a complete method to find prime factors, could be shown on a complete factor tree, with no more than one error or by division by prime factors with no more than one error or for 2, 2, 3, 5 (1)	Condone the inclusion of 1 for the method mark
		A1	for $2 \times 2 \times 3 \times 5$ oe	Accept $2^2 \times 3 \times 5$
3	No with reason	C1	for No and valid reason, eg compares $\frac{1}{3}$ with $\frac{1}{2}$ or 16 (with 24) Acceptable examples No, $\frac{1}{3}$ are red not $\frac{1}{2}$ There are 16 red counters (not 24) No as she has used the ratio 1:1 (not 1:2) Incorrect as it is 16 : 32 No as she should divide by 3 (as $1 + 2 = 3$) No as they would both be 24 so it doesn't fit in the ratio 1 : 2 No because $24 + 48 = 72$ Not acceptable examples Yes, ... No as the number of red counters would be lower There is 1 red for every 2 blue	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
20	98 ⁹¹	B1	cao	Must be clear and unambiguous
21 (a)	3 : 4	P1	for start of process, eg isolate terms in c , eg $4c = 3d$ or divide all terms by d , eg $\frac{5c}{d} + 1 = \frac{c}{d} + 4$	Accept any equivalent ratio or $c = 3, d = 4$
(b)	5 : 2	A1	for 3 : 4	
		P1	for start of process: to take all terms to one side eg $6x^2 - 7xy - 20y^2 (= 0)$ or divide all terms by y^2 , eg $\frac{6x^2}{y^2} = \frac{7xy}{y^2} + \frac{20y^2}{y^2}$ or substitute a value of x ($x > 0$) or a value of y ($y > 0$) into the equation, eg $x = 5, 150 = 35y + 20y^2$	Accept $x = 5, y = 2$ or equivalent ratios, eg, $1 : \frac{2}{5}$
		P1	for second step in process, eg $(2x - 5y)(3x + 4y) (= 0)$ or $6p^2 - 7p - 20 (= 0)$ (where $p = \frac{x}{y}$) or $20y^2 + 35y - 150 (= 0)$	
		A1	5 : 2	



Paper: 1MA1/1H				
Question	Working	Answer	Mark	Notes
1		$2 \times 2 \times 3 \times 3$	M1 A1	for complete method to find prime factors; could be shown on a complete factor tree with no more than 1 arithmetic error or 2,2,3,3,(1) $2 \times 2 \times 3 \times 3$ oe
2		14:21:42	P1 P1 P1 A1	for 2 out of 3 expressions in one letter eg from x , $x+7$ $2x+14$ or see a set of numbers to show interpretation of the relationships, eg 10, 17, 34 (dep) for sum of their 3 expressions = 77 eg $x + x + 7 + 2x + 14 = 77$ oe or 2 systematic correct trials including addition for a correct process to isolate their term in x or $x=14$ for ratio 14:21:42 oe
3	CB extended to form CG	Reasoning	B1 M1 C2 (C1)	for 35 or 75 or 145 or 105 or $DEF = 70$, marked on the diagram or 3 letter description for $180-70-35$ or $180-75-35$ or a correct pair of angles that would lead to 75 or 70, eg $AFB = 35$ and $FAB = 75$ or $AFB = 35$ and $ABG = 75$ or $FBC = 35$ and $ABG = 75$ or $EDF = 75$ and $DEF = 70$ or $FDC = 105$ and $FBC = 35$ or $ABC = 105$ and $FBC = 35$ (dep on B1M1) All figures correct with all appropriate reasons stated. Angles must be clearly labelled or on the diagram. Full solution must be seen (dep on B1 or M1) for one reason clearly used and stated.) <u>Corresponding angles</u> are equal, <u>alternate angles</u> are equal, <u>opposite angles</u> in a <u>parallelogram</u> are equal, <u>angles in a triangle</u> sum to 180, <u>angles</u> on a straight <u>line</u> sum to 180, vertically <u>opposite angles</u> are equal, <u>vertically opposite angles</u> are equal, <u>angles in a quadrilateral</u> sum to 360, <u>co-interior angles</u> sum to 180, <u>allied angles</u> sum to 180, <u>angles</u> around a <u>point</u> sum to 360



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
3	18	M1 A1	for listing factors of 72 and 90, at least 4 correct for each (with no more than 1 incorrect in each list), could be in factor pairs OR for the prime factors of 72 (2, 2, 2, 3, 3) or 90 (2, 3, 3, 5) for 18 or 2×3^2 oe SC B1 for answer of 6 or 9 if M0 scored	Factors of 72: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72 Factors of 90: 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90 $2, 3^2$ is not enough, it must be a product
4	sketch	M1 A1	for sketch of a cylinder sketch of cylinder, with dimensions shown	Hidden edges may or may not be shown 2 (cm) for radius or 4 (cm) for diameter and 5 (cm) for height
5	$c = -6$ $d = -1$	M1 A1 A1	for reflection in x-axis shown on diagram for $c = -6$ or $d = -1$ for both $c = -6$ and $d = -1$ SCB2 for $c = -1$ and $d = -6$	Vertices (3, -2), (5, -2), (3, -5) One correct value is M1A1 regardless of second value or diagram

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	$x < 5$	M1 A1	for adding 27 to both sides or dividing throughout by 7 (in an inequality or an equation) as a first step or showing 5 as the critical value cao	Can be written as $x = 5$
2	$2 \times 2 \times 31$	M1 A1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error or by division by prime factors with no more than one error or for 2, 2, 31, (1) for $2 \times 2 \times 31$ oe	Condone the inclusion of 1 for this mark Accept $2^2 \times 31$

Paper: 1MA1/1H					
Question	Answer	Mark	Mark scheme	Additional guidance	
7	1250	P1	for process to use area of base in the formula, eg $\frac{10000}{2 \times 4}$		
		A1	cao		
8	Pair of values	P1	for at least 5 multiples of 5 (with no more than 1 incorrect) or for at least 5 multiples of 7 (with no more than 1 incorrect) or for m = a multiple of 35 and n = a multiple of 14 or for $m = 35$ or $n = 14$	$m = 35, n = 14, 28, 42, 56, 84, \dots$ $m = 105, n = 14, 28, 56, 98, \dots$	
		A1	for a correct pair of values, eg $m = 35$ and $n = 14$ or $m = 35$ and $n = 28$ or $m = 105$ and $n = 14$		
9	(a)	(9), -4, -5, 0, 5, (4), (-9)	B2	for all 4 values correct	Accept a freehand curve drawn that is not made of line segments Ignore anything outside the required range
			(B1	for 2 or 3 correct values)	
	(b)	Graph drawn	B2	for a fully correct graph	
			(B1	ft (dep on B1 in (a)) for plotting at least 5 of the points from their table correctly)	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	21	M1	for a complete factor tree for 63 or 105 with no more than one arithmetic error or for listing at least 4 correct factors (with no more than 1 incorrect) of 63 or 105, could be in factor pairs or for the prime factors of 63 (3, 3, 7) or 105 (3, 5, 7)	Condone the inclusion of 1 for this mark May be seen in different ways, 1, 3, 7, 9, 21, 63 1, 3, 5, 7, 15, 21, 35, 105 Prime factors may be seen in a diagram eg a Venn diagram
		A1	cao SCB1 for an answer of 3 or 7 or 3×7 if M0 scored	
2	(a)(i)	B1	cao	
	(ii)	B1	cao	
	(b)	M1	for $9\,700\,000 + 24\,500\,000 (= 34\,200\,000)$ or 3.42×10^n ($n \neq 7$) oe or 3.4×10^7 or correct answer in incorrect form eg 34.2×10^6 or both in a form ready for addition, eg $9.7 \times 10^6 + 24.5 \times 10^6$	
		A1	cao	



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	6	M1 A1	for a complete factor tree for 54 or 120 with no more than one arithmetic error or for listing at least 4 correct factors (with no more than 1 incorrect) of 54 or 120, could be in factor pairs or for the prime factors of 54 (2, 3, 3, 3) or 120 (2, 2, 2, 3, 5) cao SCB1 for an answer of 2 or 3 or 2×3 if M0 scored	Condone the inclusion of 1 for this mark Factors of 54: 1, 2, 3, 6, 9, 18, 27, 54 Factors of 120: 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60, 120 Prime factors may be seen in a diagram eg a Venn diagram
2 (a)	0.4	P1 A1	for $1 - 0.3 - 0.1 (= 0.6)$ or $0.3 + 0.1 + 2x + x = 1$ P1 for " 0.6 " $\div 3 (= 0.2)$ or $3x = "0.6"$ or for " 0.6 " $\div 3 \times 2$ A1 for 0.4 oe	Award this mark for any two probabilities that sum to 0.6 Allow P1P1A0 for $P(\text{green}) = 0.4$ Award P1P1A0 for 0.4 with incorrect subsequent working eg $\frac{0.4}{0.6}$ If no answer on answer line then check table A0 for $\frac{0.4}{1}$
(b)	150	M1 A1	for complete method to find the total number of counters eg $45 \div 0.3$ or $45 \div 3 \times 10$ oe or $45 + 45 \div 3 + 45 \div 3 \times 4 + 45 \div 3 \times 2 (= 45 + 15 + 60 + 30)$ A1 cao	fit their table



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	(a) m^7	B1	cao	
	(b) $125n^3p^9$	B2	cao	Allow multiplication signs
		(B1)	for 2 of 3 terms correct in a single product)	$125n^3p^x$ or $125n^x p^9$ where $x \neq 0$ or an^3p^9 where a is a number
	(c) $8q^6r^3$	B2	cao	Allow multiplication signs
		(B1)	for 2 of 3 terms correct in a single product)	$8q^6r^x$ or $8q^x r^3$ where $x \neq 0$ or aq^6r^3 where a is a number
2	(a) 280	M1	for listing at least 3 multiples of both 40 and 56 OR finds the prime factors of both 40 and 56	40, 80, 120, ... 56, 112, 168, ... OR 2,2,2,5 and 2,2,2,7
		A1	cao	
	(b) 60	B1	60 or $2^2 \times 3 \times 5$ oe	$2^2, 3, 5$ not enough ie must be a product
3	$y = 3x - 6$	M1	for a correct method to find the gradient of the line, or $m = 3$ OR identifies -6 as the intercept in words or in a partial equation OR $y - b = m(x - a)$ where $m \neq 3$ and (a, b) is a correct coordinate	Just ringing -6 is insufficient
		M1	for $y = 3x + c$ or (L=) $3x - 6$ or $y = "3"x - 6$ OR $y - y_1 = 3(x - x_1)$ or $y - b = "3"(x - a)$ where (a, b) is a correct coordinate	Award of this mark implies the first M1 c must be seen either as a letter or a number
		A1	accept $y = 3x + -6$ oe	



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	4.52×10^3	M1	for $2.04... \times 10^7$ oe eg $2.04... \times 10^{-5} \div 10^{-12}$ or $20.4... \times 10^6$ or 204(08163.27) or for correct value of T , 4517.(53....), not written in standard form, eg 4520	May be given correct to 3 sig figs or more
		A1	for answer in the range 4.51×10^3 to 4.52×10^3 (SC B1 for $6.32... \times 10^{-1}$)	
	Explanation	M1	for method to find the scale factor or decreased value in T , eg $\sqrt{\frac{1.1}{1.05}}$ (= 0.97.....) oe or $\sqrt{\frac{5.6 \times 10^{-3} \times 1.1}{(1.4 \times 10^{-4} \times 1.05)}}$ (= $4.40... \times 10^3$) oe	Award mark for a correct method to calculate the scale factor or the percentage increases in w and d^3 or the decreased value of T
		C1	(dep M1) for explanation eg value of scale factor less than 1, so a decrease in T OR compares $4.40... \times 10^3$ with their value of T from (a) provided answer to (a) is greater	
10	10	P1	for start to a process to find the LCM of 20, 45 and 120 (= 360), eg $45 = 3 \times 3 \times 5$ or $20 = 2 \times 2 \times 5$ or $120 = 2 \times 2 \times 2 \times 3 \times 5$ or writes down at least 3 multiples of 45 and 120	Could be presented as complete prime factor trees for 45 or 120 Must use a common multiple. Working may be in minutes.
		P1	(dep) for a process to find number of times/hour using their LCM, eg $3600 \div 360$ or $3600 \div 720$	
		A1	for 10 or 11	



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	1080	M1	for method to write one number as a product of prime factors (condone one division error in method chosen), eg. one complete factor tree or 2, 2, 3, 3, 3 or 2, 2, 2, 3, 5 or for listing at least 5 multiples of either number (condone one error) or for any common multiple ($\neq 1080$), eg. 12960 ($= 108 \times 120$)	Accept first 5 multiples if all correct or one error in the first 6 multiples
		M1	for method to write both numbers as a product of prime factors (condone a total of one division error) eg. two complete factor trees or 2, 2, 3, 3, 3 and 2, 2, 2, 3, 5 or lists of multiples of the two numbers, at least 5 of each, one of which includes 1080	For the list not containing 1080, accept first 5 correct multiples or one error in the first 6 multiples
		A1	cao SC: B2 for any product that would lead to 1080, eg. $2^3 \times 3^3 \times 5$ or $12 \times 9 \times 10$	

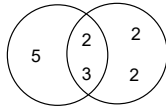


Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	$2^2 \times 5^3$	M1 M1 A1	for a complete method to find prime factors, could be shown on a complete factor tree with no more than one error or by division by prime factors with no more than one error for complete factorisation, eg 2, 2, 5, 5, 5 for $2^2 \times 5^3$	Condone the inclusion of 1 for the method marks Could be shown on a fully correct factor tree
2 (a)	$3\frac{17}{20}$	M1 A1	for finding two fractions with a correct common denominator (multiple of 20), with at least one correct corresponding numerator, eg $\frac{12}{20}, \frac{5}{20}$ or $\frac{32}{20}, \frac{45}{20}$ for $3\frac{17}{20}$ or an equivalent mixed number SC B1 for an answer of 3.85 if M0 scored	May be from $\frac{3}{5}$ and $\frac{1}{4}$ or from $\frac{8}{5}$ and $\frac{9}{4}$
(b)	shown	M1 A1	for $\frac{8}{3} \times \frac{1}{6}$ oe or $\frac{4}{9} \times \frac{6}{1}$ oe or $\frac{8}{3} \times \frac{9}{4}$ oe for unsimplified fraction which could lead to $\frac{4}{9}$, eg $\frac{8}{18}$ or for $\frac{4}{3} \times \frac{1}{3}$ or $\frac{24}{9} \div 6$ or for unsimplified fraction which could lead to $2\frac{2}{3}$, eg $\frac{24}{9}$ or for unsimplified fraction which could lead to 6, eg $\frac{72}{12}$	



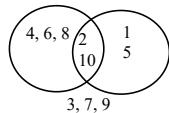
Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
5 (a)	63	B1	for 63, accept $3 \times 3 \times 7$ or $3^2 \times 7$	(A =) $2^2 \times 3^4 \times 7$ scores 0 marks
		M1	for at least two of $2^2, 3^4, 7^2$ or shows at least 3 multiples of 2268, eg 2268, 4536, 6804 and at least 3 multiples of 441, eg 441, 882, 1323	
		A1	for 15876 or $2^2 \times 3^4 \times 7^2$ oe	
6	65	P1	for a correct process to find the number of seconds, eg $67\,205\,600 \div 11.9 (= 5\,647\,529.4\dots)$ or for a correct process to convert between seconds and days, eg $24 \times 60 \times 60 (= 86\,400)$ oe, may be seen in stages or $11.9 \times 60 \times 60 \times 24 (= 1\,028\,160)$	Note that this mark may be awarded at any stage in the working. If a correct answer within the range is shown in working but incorrectly rounded award full marks.
		P1	for a complete process, eg “5 647 529.4...” $\div$ “86 400” or $67\,205\,600 \div$ “1 028 160”	
		A1	accept answers in the range 65 to 65.4 or 66	
7 (a)	(1, -3)	B1	cao	
		B1	for an answer in the range -0.8 to -0.6 or 2.6 to 2.8	
8	648	M1	for substitution into density formula eg 9×72 or $9 = \frac{m}{72}$	
		A1	cao	

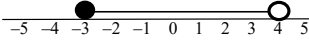


Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
(b)	4	M1	for a correct first step, eg for adding 7 to both sides $5y - 7 + 7 < 16 + 7$ or for dividing throughout by 5 eg $\frac{5y - 7}{5} < \frac{16}{5}$ or for showing 4.6 (oe) as the critical value or for $5 \times 4 - 7$ with 13 seen as answer	Allow use of any inequality or as an equation for the first mark Award 1 mark for 4.6 oe, eg $y = \frac{23}{5}$ or $y < 4.6$
		A1	for 4 or $y = 4$ with no incorrect working	An answer of 4 from incorrect working can score 1 mark at most.
5	4 packs and 5 boxes,	P1	for start of a process to find common multiples of 30 and 24, eg writes down at least 3 multiples of 30 and at least 3 multiples of 24 or draws factor trees for both 30 and 24 with no more than 1 error in total or draws a correct Venn diagram	30, 60, 90, 120, 150, 180, 210, 240 ... 24, 48, 72, 96, 120, 144, 168, 192, 216, 240, ... Condone the inclusion of 1 in factor trees or Venn diagrams for this mark 
		P1	for identifying a common multiple eg 120 or 240 or $5 \times 3 \times 2 \times 2$ oe	May use any common multiple, 120, 240, 360...
		A1	for 4 packs and 5 boxes or any multiple of this pairing eg 8, 10	Award 0 marks for a correct answer without correct supportive working.



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1	16.2	M1 A1	for a correct first step to find BC , eg $19^2 = 10^2 + BC^2$ or $19^2 - 10^2 (= 261)$ or $\sqrt{19^2 - 10^2}$ or $\sqrt{261}$ or $3\sqrt{29}$ for answer in the range 16.1 to 16.2	Can use alternative letter for BC provided intention is clear If using an alternative method using trigonometry must have BC as the only unknown ISW incorrect rounding if answer given in range
2 (a)	$2 \times 3 \times 3 \times 5$	M1 A1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one error or by division by prime factors with no more than one error or for 2, 3, 3, 5 for $2 \times 3 \times 3 \times 5$ oe	Condone the inclusion of 1 for this mark Accept $2 \times 3^2 \times 5$
(b)	36	B1	for 36	Accept $2^2 \times 3^2$ or $2 \times 2 \times 3 \times 3$
3	4	M1 A1	for method to use formula, eg $72 \div 6 (= 12)$ or $72 \div 9 (= 8)$ cao	Can be implied by $\frac{72}{6}$ or $\frac{72}{9}$

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	$2 \times 2 \times 3 \times 7$	M1	for a complete method to find prime factors, could be shown on a factor tree, with no more than one arithmetic error or for 2, 2, 3, 7	Condone the use of 1
		A1	for $2 \times 2 \times 3 \times 7$ oe	Accept $2^2 \times 3 \times 7$
		M1	for at least 3 multiples of both 60 and 84 (can include 60 and 84) or finds the prime factors of both 84 (may be seen in (a)) and 60, may be seen in factor trees	60, 120, 180, 240, 300, 360, 420 84, 168, 252, 336, 420 $60 = 2 \times 2 \times 3 \times 5$ or $2^2 \times 3 \times 5$ If factor tree in (a) is incorrect ft this factor tree in part 3 (b) for M1 only
		A1	420 or $2 \times 2 \times 3 \times 5 \times 7$ oe	
2 (a)	Venn diagram	M1	for correct numbers in at least one region	Ignore all entries except the region you are marking for each method mark
		M1	for correct numbers in at least two regions	
		A1	for all regions correct	
				
(b)	$\frac{2}{10}$	M1	for $\frac{a}{10}$ where $0 < a < 10$ and a is an integer or $\frac{2}{b}$ where $b > 2$ and b is an integer or ft diagram	Need not be written in correct form at this stage eg could be a ratio 2 : 10 Repeated digits in the diagram should be counted as 2 elements
		A1	$\frac{2}{10}$ oe or ft diagram	Accept any equivalent fraction, decimal form 0.2 or percentage form 20%

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	$x > -1$	B1	cao	
(b)	Diagram drawn	C2	for a fully correct diagram, eg 	
		(C1)	for drawing a line from -3 to 4 or (indep) for an open circle at 4 or (indep) for a closed circle at -3)	Condone arrow heads or line ending to denote the 'end' of the line
2 (a)	12	M1	for a correct factor tree for either 60 or 84 with no more than one arithmetic error or for listing factors of 60 or 84, at least 4 correct for either (with no more than 1 incorrect in either list), could be in factor pairs or for the prime factors of 60 (2, 2, 3, 5) or 84 (2, 2, 3, 7)	Condone the use of 1 in any factor tree 60: 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 84: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
		A1	for 12 or $2 \times 2 \times 3$ oe SC B1 for answer of 4 or 6, if M0 scored	2,2,3 is not enough, it must be a product
(b)	120	M1	for a correct factor tree for either 24 or 40 with no more than one arithmetic error or for at least 3 multiples of both 24 and 40 (can include 24 and 40) or for the prime factors of either 24 (2, 2, 2, 3) or 40 (2, 2, 2, 5) or for a common multiple from their lists ($\neq 120$)	Condone the use of 1 in any factor tree 24: 24, 48, 72, 96, 120, ... 40: 40, 80, 120, ... For the list not containing 120, accept the first 3 correct multiples or one error in the first 4 multiples
		A1	for 120 or $2 \times 2 \times 2 \times 3 \times 5$ oe	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
3 (a)	$2^2 \times 3 \times 13$	M1	for a complete method to find prime factors; could be shown in a complete factor tree with no more than one error or by division by prime factors with no more than one error or for 2, 2, 3, 13 (1)	Condone the inclusion of 1 for this mark
		A1	$2^2 \times 3 \times 13$ or $2 \times 2 \times 3 \times 13$ oe	
(b)	26	M1	for a correct factor tree for 130 (or 156 if not credited in part (a)) with no more than one arithmetic error or for listing factors of 156 or 130, at least 4 correct for either (with no more than 1 incorrect in either list), could be in factor pairs or for the prime factors of 130 (2, 5, 13) (or 156 if not credited in part (a)) or identifies a common factor other than 1 (2 or 13)	Condone the inclusion of 1 for this mark 1, 2, 3, 4, 6, 12, 13, 26, 39, 52, 78, 156 1, 2, 5, 10, 13, 26, 65, 130
		A1	cao	



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
1 (a)	2×5^3	M1	for a complete method to find prime factors; could be shown on a complete factor tree with no more than one arithmetic error or by division by prime factors with no more than one error or for 2, 5, 5, 5	Condone the inclusion of 1s for this mark
		A1	accept $2 \times 5 \times 5 \times 5$	
	150	M1	for at least 3 multiples of both 30 and 25 (can include 30 and 25) or for the prime factors 2, 3, 5 and 5, 5 (could be shown in a factor tree with no more than 1 arithmetic error or Venn diagram or table) or identifies the factors 5, 5 and 6 (may be seen in a grid) or for a different common multiple, eg 300	30, 60, 90, 120, 150, 180, 210, 240 25, 50, 75, 100, 125, 150, 175 $30 = 2 \times 3 \times 5$ $25 = 5 \times 5$ Condone the inclusion of 1s for this mark
		A1	150 or $2 \times 3 \times 5 \times 5$ oe	
(b)				

Paper 1MA1: 3H				
Question	Working	Answer	Mark	Notes
10		6 (%)	P1 P1 A1	for y^5 oe or $8029.35 \div 6000$ for a process to find $1+x$ e.g. $\sqrt[5]{(8029.35 \div 6000)}$ or 1.06 or 1.0599.. 5.99 to 6
11		No (supported)	P1 C1	Process to find number of rose trees e.g. $215 \div 17 (=12.647\dots)$ or show number of choices with 12 and 13 eg $17 \times 12 = 204$ and $17 \times 13 = 221$ No with interpretation that 12.6.. is not a whole number or a whole number of plants must be bought or number of plants would have to be between 12 and 13 which is not possible
12		3 : 4 : 11	P1 P1 A1	Makes a start e.g. by using multipliers e.g. $1 + 5 = 6$ and $7 + 11 = 18$ and $6 \times 3 = 18$ or $AB:BD = 3:15$ or $x=3y$ (appropriate x and y shown) or $\frac{1}{6} = \frac{3}{18}$ Complete process to find ratios e.g. $(7 + 11) \div (1 + 5) = 3$ and $1 \times "3" : 7 - ("3" \times 1) : 11$ oe
13		$y \geq -2, y \geq x$ and $y \leq 0.5x + 1$	M1 M1 M1 A1	$y = -2$ indicated; accept any inequality for " $\geq$ " $y = x$ oe indicated; accept any inequality for " $\geq$ " $y = 0.5x + 1$ oe indicated; accept any inequality for " $\geq$ " $y \geq -2, y \geq x$ and $y \leq 0.5x + 1$
14 (a)		$\frac{x+4}{2x+3}$	M1 M1 A1	Factorising the denominator $(2x \pm 3)(x \pm 4)$ or $2(x \pm 1\frac{1}{2})(x \pm 4)$ Factorising the numerator $(x - 4)(x + 4)$ oe
(b)		$v = \frac{15t}{w+30}$	M1 M1 A1	A correct step towards solution e.g. expanding brackets to get $15t - 30v$ or multiply both sides by v For a method to rearrange the formula to isolate terms in v eg $vw + 30v = 15t$ oe



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
14	240	M1	for start to method to find total number of matches, eg 16×15 or $16^2 - 16$ or $16 \times 15 \times 2 (= 480)$ or $\frac{16 \times 15}{2} (= 120)$	Credit complete listing strategies
		A1	cao	
15 (a)	488 to 507	M1	for method to find area of one strip using trapezia, eg $\frac{1}{2} \times 5 \times 22 (= 55)$ or $\frac{1}{2} \times 5 \times (22 + 28) (= 125)$ or $\frac{1}{2} \times 5 \times (28 + 32) (= 150)$ or $\frac{1}{2} \times 5 \times (32 + 35) (= 167.5)$ OR for a method to find an estimate for the area using rectangles eg 5×22 or 5×28 or 5×32 or 5×35	May use area of triangle + area of rectangle for the second, third and fourth strips – lengths must be correct. May use triangle for first strip, $\frac{1}{2} \times 5 \times 22$
		M1	for complete and correct method to find the area using four strips, eg $\frac{1}{2} \times 5 \times 22 + \frac{1}{2} \times 5 \times (22 + 28) + \frac{1}{2} \times 5 \times (28 + 32) + \frac{1}{2} \times 5 \times (32 + 35)$ or $5 \times 22 + 5 \times 28 + 5 \times 32 + 5 \times 35$	
		A1	for answer in the range 488 to 507 (SC B1 for using area under the curve)	May use triangle for first strip, $\frac{1}{2} \times 5 \times 22$
(b)	Underestimate (supported)	C1	(dep M1) for underestimate since parts not included below the graph OR ft their method	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	2.2	P1 P1 A1	works out interest for one year, eg $3550 \times 0.026 (= 92.3(0))$ or $3550 \times 1.026 (= 3642.3(0))$ for compound interest calculation, eg $3550 \times 1.026^2 (= 3736.9\dots)$ or for an answer given as 0.0219... or 1.0219... answer in range 2.19 to 2.2	If an answer in the range is seen in working and then incorrectly rounded award full marks
14	7	M1 A1	method to find number of combinations, eg 19×25 oe ($= 475$) or for $3325 \div 19 (= 175)$ or $3325 \div 25 (= 133)$ cao	
15	$6x^3 - 23x^2 - 33x - 10$	M1 M1 A1	for method to find the product of any two linear expressions (3 out of no more than 4 terms correct with correct signs or 4 correct terms ignoring signs) for method of multiplying out remaining products, half of which are correct (ft their first product) cao	Note that, for example, $6x^2 + 7x$ or $7x + 2$ are regarded as three terms in the expansion of $(3x + 2)(2x + 1)$ First product must be quadratic but need not be simplified or may be simplified incorrectly



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
10 (a)	1	B1	cao	
	(b) $\frac{8}{x-4}$	B1	cao	
	(c) $27n^{12}w^6$	B2 (B1)	cao for two of $27, n^{12}, w^6$ in a product	
11	Yes (supported)	P1	for process to find number of combinations, eg 5×8 oe (= 40) or for $240 \div 5$ (= 48) or $240 \div 8$ (= 30) or for $240 \div 5 \div 8$ (= 6) or $5 \times 8 \times x = 240$	
		C1	Yes and 6	
12 (a)	-0.09	M1	for suitable method to find gradient, eg $27 \div 300$	Any readings from the graph must be reasonable. Condone missing negative for M1 Can fit explanation linked to incorrect gradient in part (a)
		A1	for answer in the range -0.1 to -0.08 oe	
		C1	for explanation Acceptable examples volume of petrol used each km litres/km Rate of fuel consumption For every 9 litres you can travel 100km Not acceptable examples volume $\div$ distance volume of petrol used per distance km/litre as distance increases volume decreases	



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
12	$6x^3 + x^2 - 20x - 12$	M1 M1 A1	for method to find the product of any two linear expressions (3 out of no more than 4 terms correct with correct signs or 4 correct terms ignoring signs), eg. $6x^2 + 9x + 4x + 6$ or $3x^2 + 2x - 6x - 4$ or $2x^2 + 3x - 4x - 6$ for method of multiplying out remaining products, half of which are correct (ft their first product), eg. $6x^3 + 13x^2 - 12x^2 + 6x - 26x - 12$ cao	Note that, for example, $6x^2 + 13x$ or $13x + 6$ are regarded as three terms in the expansion of $(x - 2)(3x + 2)$ First product must be quadratic but need not be simplified or may be simplified incorrectly.
13	192 000	M1 A1	for $16 \times 120 \times 100$ oe cao	
14	25 with reasons	M1 M1 C2 (C1)	for method to find angle BCD eg $180 \div (3 + 1)$ (= 45) or $BAD = 180 \div (3 + 1) \times 3$ (=135) for method to find angle BDA eg $180 - 20 - (180 - "45")$ (=25) or method to find angle SBD eg $SBD = BCD$ (=45) for finding SBA (=25) and both reasons given, eg <u>Opposite angles</u> of a <u>cyclic quadrilateral</u> add up to 180 for angle $SBD = 45$ because <u>alternate segment</u> theorem (dep M1) for one reason given <u>Opposite angles</u> of a <u>cyclic quadrilateral</u> add up to 180 for angle $SBD = 45$ because <u>alternate segment</u> theorem)	Could be shown on the diagram or in working Do not award if it ambiguous as to which angle is being found Underlined words need to be shown; reasons need to be linked to their method



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
10	24000	P1 P1 A1	for use of either 0.9 or 0.875 or for 18900 (after 2 years) for using $0.9^2 \times 0.875 (= 0.70875)$ oe or for 21000 (after 1 year) cao	
11	240	M1 A1	for $16 \times 5 \times 3$ cao	
12	23.4	M1 M1 A1 M1 M1 A1	for stating that $AC = 8$ or for a relationship that may be used to find AC eg $(AC =) 8 \times \tan 45$ or $\tan 45 = \frac{AC}{8}$ for relationship that may be used to find AB, eg $\sin(20) = \frac{8}{AB}$ or $(AB =) \frac{8}{\sin 20}$ for answer in the range 23.3 to 23.4 Alternative for a relationship that may be used to find AD eg $\cos(45) = \frac{8}{AD}$ oe or $(AD =) 11.3(13\dots)$ for a relationship that may be used to find AB, eg $\frac{AB}{\sin 45} = \frac{11.3}{\sin 20}$ for answer in the range 23.3 to 23.4	May be seen on diagram May use the sine rule If an answer is given in the range in working and then rounded incorrectly award full marks. May be seen on diagram If an answer is given in the range in working and then rounded incorrectly award full marks.

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	0.000675	B1	cao	If the answer (for 2 marks) is seen in working and then rounded or truncated, award full marks.
(b)	6.592×10^5	M1	for 10.5472×10^3 oe or 1.6×10^8 oe or 2.575×10^{-1} oe or for 6.592×10^n where $n \neq 5$ or for 6.59×10^5 or for 6.6×10^5 or for 659200 oe	
		A1	cao	
10	Explanation	C1	for full explanation indicating the problem with the negative signs Acceptable examples He should have $+2x + 4$ on the second line He should have done -4 and $-2x$ $3x - -2x = 5x$, not $1x$ Two minuses make a plus which he didn't account for Not acceptable examples He has not expanded the brackets Peter has to factorise first He did not collect the terms He didn't include the x^2	
11	5, 6, 7	M1	for identification of possible values of x (4,5,6,7) or of y (5,6,7,8,9)	Could be shown on a number line or using a Venn diagram This mark can be awarded for an answer of 4, 5, 6, 7 Answers may be given in any order.
		A1	cao	
12	1.2, 1.3	B1	for 1.2 in the correct position	Accept $1.2\dot{9}$ or 1.299... must be 9 recurring.
		B1	for 1.3 in the correct position	

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	Statements	C1 C1	Makes reference to the fact that the label on the horizontal axis is missing Makes reference to the fact that the graph has not been plotted at the top end of the class intervals, eg has plotted at midpoints	
14	(a) $81x^{20}y^{24}$ (b) $x^3+3x^2-10x-24$	B2 (B1 M1 M1 A1	cao for two of $81, x^{20}, y^{24}$) for method to find the product of any two linear expressions (3 out of 4 terms correct or 4 correct terms ignoring signs), eg $x^2 + 2x - 3x - 6$ or $x^2 + 2x + 4x + 8$ or $x^2 + 4x - 3x - 12$ for a complete method to find all terms, at least half of which are correct (ft their first product), eg $x^3 + 4x^2 + 2x^2 - 3x^2 + 8x - 6x - 12x - 24$ cao	Note that, for example $-x - 6$ in expansion of $(x + 2)(x - 3)$ is regarded as 3 correct terms. First product must be quadratic with at least 3 terms but need not be simplified or may be simplified incorrectly
15	Shown	M1 C1	for one correct product eg $7 \times 5 (= 35)$ or $13 \times 5 (= 65)$ or $7 \times 13 \times 5 (= 455)$ for showing three correct products added eg $35 + 65 + 455$	Ignore additional products There is no need to show the three products sum to 555



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
19	7	P1 A1	for process to use product rule to find number of desserts, eg $5 \times 12 \times \text{desserts} = 420$ or $420 \div (5 \times 12)$ oe cao	
20 (a)	$(5x - 2)^2$	M1 A1	for a first step to change the subject of $y = \frac{\sqrt{x} + 2}{5}$ or $x = \frac{\sqrt{y} + 2}{5}$, eg $5y = \sqrt{x} + 2$ or $5x = \sqrt{y} + 2$ oe	
(b)	55	M1 M1 A1	for method to find $gf(x)$, eg $\frac{\sqrt{3x+4} + 2}{5}$ or method to find $g^{-1}(3)$, eg $(5 \times 3 - 2)^2 (= 169)$ for method to solve as far as 2 steps away, eg $(5 \times 3 - 2)^2 = 3x + 4$ or $3x + 4 = "169"$ or for a complete method, eg $(("169" - 4) \div 3)$ cao	



Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	435	M1	for start to method of finding the number of pairs, eg $30 \times 29 (= 870)$ or $\frac{30 \times 29}{2}$ or clear intention to sum the integers from 1 to 29 eg $29 + 28 + \dots + 2 + 1$	M1 for $\frac{1}{30} \times \frac{1}{29}$
		A1	cao	
14	4400	P1	for start to processes needed to find the investment, eg $2937.14 + 1000 (= 3937.14)$ OR starts to work with algebra, eg $P \times 1.035 - 750$	
		P1	for process to find amount of money at the beginning of 2023 after the first withdrawal, eg " $3937.14 \div 1.035 (= 3804)$ or $[\text{value}] \div 1.035$ " OR writes down complete equation, eg $(P \times 1.035 - 750) \times 1.035 - 1000 = 2937.14$	[value] can be 2937.14 or $2937.14 + 750$ or $2937.14 + 1750$
		P1	for complete process, eg " $(3804 + 750) \div 1.035$ " OR for a start to the process to solve the equation to find $1.035P - 750$ eg $P \times 1.035 - 750 = \frac{2937.14 + 1000}{1.035}$ or $1.035P - 750 = 3804$ or for a start to the process to solve the complete equation eg $1.035^2P - 776.25 = 2937.14 + 1000$ or $1.035^2P - 1000 = 2937.14 + 776.25$ or $1.035^2P = 2937.14 + 776.25 + 1000$	
		A1	cao	A correct answer with no supportive working gets 0 marks



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
13 (a)	No with reason	C1	for No with reason, Acceptable examples No, $4 \div 4 \neq 8 \div 6$ No, $4 \div 4 \neq 8 \div 6$ so they don't have the same constant No because $y = kx$ doesn't work No, it won't pass through (0, 0) Not acceptable examples Yes, ... No, they don't increase by the same number No, they don't have the same constant	
(b)(i)	49	M1	for stating a correct relationship, eg $w = k \times \sqrt{t}$ or $140 = k \times \sqrt{64}$ oe	Condone the use of ' α ' instead of '=' for both M marks
		M1	for method to find constant of proportionality, eg $140 \div \sqrt{64} (= 17.5)$ oe	Award of this mark implies the previous mark
		A1	cao	
(ii)	sketch	C1	for sketch	Sketch at end of mark scheme
14	180	M1	for $10 \times 9 \times 4 (= 360)$ or $10 \times 9 \times 4 \div 2$ or $10 \times 9 \div 2 (= 45)$ or $(9 \times 4) + (8 \times 4) + (7 \times 4) + (6 \times 4) + (5 \times 4) + (4 \times 4) + (3 \times 4) + (2 \times 4) + (1 \times 4)$ oe	
		A1	cao	



Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
14		Region R shaded	M1 M1 A1	for two of the lines $y = 1$, $x + y = 5$, $y = 2x$ correctly drawn for three lines correctly drawn for fully correct region indicated with all lines correct
15 (a) (b)		No with reason 66	C1 M1 A1	for “no” with reason, eg Tracey should multiply 8 and 7 for starting a method to find number of games played, eg $12 \times 11 (= 132)$ or sum of integers from 1 to 11 cao
16	$\frac{- - 4 \pm \sqrt{(-4)^2 - 4 \times 1 \times 1}}{2 \times 1}$	0.268, 3.73	M1 A1	for $x - 2 = \pm\sqrt{3}$ oe or one solution or use of $x^2 - 4x + 1 = 0$ to substitute into formula (allow one error in substitution) 0.267 – 0.27, 3.7 – 3.74



Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
11	1335	M1	for one correct procedure eg $9 \times 15 (=135)$ or $15 \times 8 (=120)$ or $9 \times 15 \times 8 (=1080)$	Ignore additional products.
		M1	for all three correct products eg "135", "120", "1080" or 9×15 , 15×8 , $9 \times 15 \times 8$ oe	Only these three products must be identified. There is no need to indicate summing at this stage.
		C1	for showing the three correct products added eg $135 + 120 + 1080$	There is no need to show the three products sum to 1335
12	(a)	M1	factorises numerator of $4x^2 - 9$ eg $(2x - 3)(2x + 3)$ oe	$\frac{2x(2x-3)(2x+3)}{3x(2x+3)(x-3)}$
		M1	factorises denominator eg $x(x-3)$ or $3(2x+3)$ or for $3x(2x^2 - 3x - 9)$	
		A1	cancels to give $\frac{4x-6}{3x-9}$	
	(b)	M1	method to use a common denominator eg $x(x+1)(x-2)$ by multiplying terms	Method must involve finding equivalents for all three separate terms; may be done in several stages.
		M1	deduce numerator eg $3x(x-2) + x(x+1) - 4(x+1)(x-2)$	Equivalents must be algebraically equivalent and must have involved full simplification.
		A1	oe	



Paper: 1MA1/3H														
Question	Answer	Mark	Mark scheme	Additional guidance										
15	Shown	M1	for method to find comparable ratios eg $(21.6 + 58.4) \div 32 (= 2.5)$ and $(32 + 22) \div 21.6 (= 2.5)$ or $32 \div (21.6 + 58.4) (= 0.4)$ and $21.6 \div (32 + 22) (= 0.4)$ or $21.6 \div 32 (= 0.675)$ and $(32 + 22) \div (21.6 + 58.4) (= 0.675)$ or $32 \div 21.6 (= 1.48\bar{1})$ and $(21.6 + 58.4) \div (32 + 22) (= 1.48\bar{1})$	Fractions may be used. Accept 3 sf or more.										
		C1	for correct conclusion supported by the correct evaluation of 2 ratios to show they are equal	We do not require reference to the common angle.										
16	$\frac{1}{120}$	P1	for correctly identifying at least two of the number of options, eg 2 options for 1st digit, 4 options for 2nd digit	May be seen as part of a calculation <table border="1"><thead><tr><th>Position of digit</th><th>Number of options</th></tr></thead><tbody><tr><td>1st</td><td>2</td></tr><tr><td>2nd</td><td>4</td></tr><tr><td>3rd</td><td>3</td></tr><tr><td>4th</td><td>5</td></tr></tbody></table>	Position of digit	Number of options	1st	2	2nd	4	3rd	3	4th	5
Position of digit	Number of options													
1st	2													
2nd	4													
3rd	3													
4th	5													
		P1	for process to multiply the four numbers of options with at least three correct, eg $2 \times 4 \times 3 \times 5 (= 120)$ or for process to multiply 4 fractions with at least 3 correct $\frac{1}{2} \times \frac{1}{4} \times \frac{1}{3} \times \frac{1}{5}$ oe											
		A1	for $\frac{1}{120}$ oe											



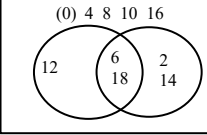
Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	Shown	M1	for a method to find the product of any two linear expressions (3 out of 4 terms correct or 4 terms ignoring signs) eg $2x^2 - 2x + 3x - 3$ ($= 2x^2 + x - 3$) or $x^2 - x + 2x - 2$ ($= x^2 + x - 2$) or $2x^2 + 4x + 3x + 6$ ($= 2x^2 + 7x + 6$)	Note that, for example, $2x^2 + x$ in the expansion of $(2x + 3)(x - 1)$ is regarded as 3 correct terms
		M1	(dep on M1) for a complete method to obtain all terms, half of which are correct (ft their first product) eg $2x^3 - 2x^2 + 3x^2 + 4x^2 - 3x - 4x + 6x - 6$ or $2x^3 - 2x^2 + 4x^2 - 4x + 3x^2 - 3x + 6x - 6$ or $2x^3 + 4x^2 + 3x^2 + 6x - 2x^2 - 4x - 3x - 6$ or $2x^3 + 4x^2 + x^2 - 3x + 2x - 6$ or $2x^3 + 2x^2 + 3x^2 - 4x + 3x - 6$ or $2x^3 - 2x^2 + 7x^2 - 7x + 6x - 6$	First product must be quadratic with at least 3 terms but need not be simplified or may be simplified incorrectly
		C1	for $2x^3 + 5x^2 - x - 6$ from correct working	Accept $a = 2, b = 5, c = -1, d = -6$ Condone $-1x$
14	27720	P1	for 15×14 ($= 210$) or 12×11 ($= 132$) or 15×12 ($= 180$)	If values given as probabilities can award P marks only
		P1	for a complete method eg $15 \times 14 \times 12 \times 11$	If a correct product seen and divided (by 2 or 4 or 24) award P marks
		A1	cao	
			SCB1 for an answer of 342 if P0 awarded	



Paper: IMA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
16 (a)	125	M1	for method to find the number of 3 digit combinations, eg 5^3 or $5^3 - 1$	
		A1	for 125 or 124	
	60	M1	for method to find the number of combinations with 3 different digits eg $5 \times 4 \times 3$ or finds there are 65 combinations that do not have 3 different digits	
		A1	cao	
17	-1, 2.5	P1	for process to form an equation, eg $\frac{x^2}{3x+5} = \frac{1}{2}$ or $2x^2 = 3x + 5$	
		P1	for writing in a suitable form ready for solution, eg $2x^2 - 3x - 5 (= 0)$ or $-2x^2 + 3x + 5 (= 0)$	
		P1	(dep 1st P1) for process to solve quadratic equation of form $ax^2 + bx + c (= 0)$	
			eg $(2x - 5)(x + 1) (= 0)$	
			or $\frac{- -3 \pm \sqrt{(-3)^2 - 4 \times 2 \times -5}}{2 \times 2}$	
		A1	for -1, 2.5 oe	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
4	statements	C1	for identifying that the number 17 should only be in the intersection Acceptable examples 17 should only be in the middle Take 17 out of (set) A only appropriate 17 crossed out on the Venn diagram Not acceptable examples Tom should put 17 in B Should have two 17's in the middle Take 17 out of (set) A Needs to remove a 17 17 is on twice	Accept correct descriptions using correct set notation for both marks Diagram may be used to support statements
		C1	for identifying that the number 1 is missing from the diagram Acceptable examples 1 should be in the outside region He should put 1 outside the circles Tom needs to put the number 1 on the diagram include 1 (outside $A \cup B$) 1 added to the diagram in the correct region Not acceptable examples Add the remaining numbers There are missing odd numbers between 0 and 20 put all the odd numbers outside the circles add the odd numbers in the $\mathcal{E}$ box include the even numbers 1 should be outside the Venn diagram	



Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
2	Venn Diagram	C1 C1 C1	for one correct region for two correct regions for all regions correct	(0) 4 8 10 16  Ignore all entries except the region you are marking for each mark
3	$1\frac{8}{15}$	M2 (M1) A1	for a complete method, eg $4 - 2 + \frac{3}{15} - \frac{10}{15}$ condoning error with one numerator or for $\frac{21}{5} - \frac{8}{3} = \frac{63}{15} - \frac{40}{15} (= \frac{23}{15})$ with no more than one error for finding two fractions with a correct common denominator, with at least one correct corresponding numerator, eg $\frac{3}{15}, \frac{10}{15}$ or for converting both to improper fractions, eg $\frac{21}{5}, \frac{8}{3}$ $1\frac{8}{15}$ oe	 At least one improper fraction must be correct Any equivalents must be a mixed number