



GuideMyGrades

— YOUR GOALS. OUR EXPERTISE. —

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

Angles, Polygons & Bearings (G1)

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

68 questions · 213 marks · Mark schemes included

Past papers June 2017 - June 2025 · 3 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
G1a ANGLE FACTS & PARALLEL LINES		40 Qs · 133 marks	3
1. Q15	GCSE Paper 3F November 2021	1	4
2. Q4	GCSE Paper 1F November 2023	1	5
3. Q5	GCSE Paper 1F June 2025	1	6
4. Q15	GCSE Paper 2F June 2018	2	7
5. Q9	GCSE Paper 1F November 2019	2	8
6. Q9	GCSE Paper 1F November 2022	2	9
7. Q6	GCSE Paper 2F November 2022	2	10
8. Q7	GCSE Paper 3F November 2024	2	11
9. Q9	GCSE Paper 2F June 2017	3	12
10. Q28	GCSE Paper 1F November 2019	3	13
11. Q8	GCSE Paper 2F November 2020	3	14
12. Q11	GCSE Paper 3F November 2020	3	15
13. Q13	GCSE Paper 2F November 2021	3	16
14. Q11	GCSE Paper 2F June 2022	3	17
15. Q13	GCSE Paper 3F November 2022	3	18
16. Q8	GCSE Paper 1F June 2023	3	19
17. Q7	GCSE Paper 2F June 2023	3	20
18. Q8	GCSE Paper 1F June 2024	3	21
19. Q7	GCSE Paper 2F June 2024	3	22
20. Q7	GCSE Paper 1F November 2024	3	23
21. Q21	GCSE Paper 1F November 2024	3	24
22. Q9	GCSE Paper 2F June 2025	3	25
23. Q25	GCSE Paper 1F November 2017	4	26
24. Q7	GCSE Paper 3F November 2017	4	27
25. Q14	GCSE Paper 1F November 2018	4	28
26. Q22	GCSE Paper 2F November 2018	4	29
27. Q24	GCSE Paper 1F November 2019	4	30
28. Q17	GCSE Paper 2F November 2019	4	31
29. Q23	GCSE Paper 1F November 2023	4	32
30. Q19	GCSE Paper 2F November 2023	4	33
31. Q26	GCSE Paper 2F June 2024	4	34
32. Q13	GCSE Paper 2F November 2024	4	35
33. Q16	GCSE Paper 1F June 2025	4	36
34. Q13	GCSE Paper 3F June 2025	4	37



QUESTION	SOURCE	MARKS	PAGE
35. Q13	GCSE Paper 3F June 2017	5	38
36. Q12	GCSE Paper 1F June 2019	5	39
37. Q25	GCSE Paper 1F November 2020	5	40
38. Q20	GCSE Paper 3F June 2022	5	41
39. Q22	GCSE Paper 3F June 2023	5	42
40. Q20	GCSE Paper 3F June 2024	5	43
G1b POLYGONS & PROPERTIES OF SHAPES		21 Qs · 57 marks	44
41. Q3	GCSE Paper 1F June 2024	1	45
42. Q4	GCSE Paper 2F November 2024	1	46
43. Q9	GCSE Paper 1F June 2018	2	47
44. Q20	GCSE Paper 3F June 2019	2	48
45. Q28	GCSE Paper 2F November 2020	2	49
46. Q6	GCSE Paper 1F November 2021	2	50
47. Q6	GCSE Paper 3F June 2022	2	51
48. Q9	GCSE Paper 3F June 2022	2	52
49. Q8	GCSE Paper 3F June 2023	2	53
50. Q7	GCSE Paper 2F November 2023	2	54
51. Q8	GCSE Paper 1F June 2025	2	55
52. Q28	GCSE Paper 1F November 2018	3	56
53. Q27	GCSE Paper 1F June 2022	3	57
54. Q7	GCSE Paper 2F June 2022	3	58
55. Q10	GCSE Paper 3F November 2023	3	59
56. Q19	GCSE Paper 3F June 2017	4	60
57. Q28	GCSE Paper 3F June 2019	4	61
58. Q29	GCSE Paper 3F November 2019	4	62
59. Q23	GCSE Paper 1F November 2024	4	63
60. Q24	GCSE Paper 1F June 2025	4	64
61. Q26	GCSE Paper 3F June 2018	5	65
G1c BEARINGS		7 Qs · 23 marks	66
62. Q17	GCSE Paper 3F June 2023	2	67
63. Q27	GCSE Paper 2F November 2023	2	68
64. Q9	GCSE Paper 2F November 2017	3	69
65. Q14	GCSE Paper 3F June 2025	3	70
66. Q13	GCSE Paper 1F November 2020	4	71
67. Q13	GCSE Paper 3F June 2022	4	72
68. Q27	GCSE Paper 1F November 2019	5	73



QUESTIONS

68 questions · 213 marks · 3 sub-topics

SUB-TOPIC G1a

ANGLE FACTS & PARALLEL LINES

Sub-topic G1a · 40 questions · 133 marks · lowest tariff first



14 A stadium cost £600 million.

$\frac{13}{15}$ of this cost was for the building.

The rest of the cost was for the land.

Work out the cost of the land.

£..... million

(Total for Question 14 is 3 marks)

15 Jenna measures all the angles around a point.

Her results are 23° , 145° , 23° and 69°

Explain why these results cannot be true.

.....

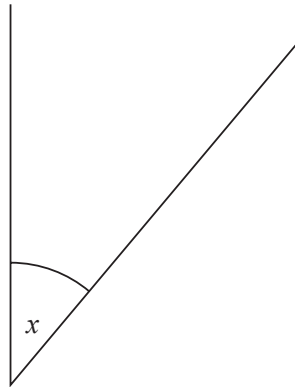
.....

.....

(Total for Question 15 is 1 mark)



- 4 Measure the size of the angle marked x .



(Total for Question 4 is 1 mark)

- 5 Work out $\frac{1}{5}$ of 300

(Total for Question 5 is 1 mark)

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Simplify $e + e + e + e + e$

.....
(Total for Question 1 is 1 mark)

- 2** Write $\frac{3}{4}$ as a decimal.

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

- 3** Change 60 millimetres into centimetres.

..... centimetres
(Total for Question 3 is 1 mark)

- 4** Write down a multiple of 8 that is between 25 and 35

.....
(Total for Question 4 is 1 mark)

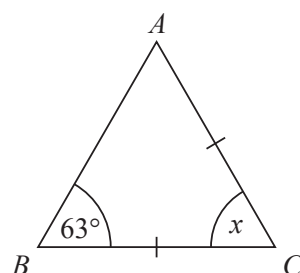
- 5** Angle A is 53°

What type of angle is angle A ?

.....
(Total for Question 5 is 1 mark)



15 Mary needs to work out the size of angle x in this diagram.



She writes

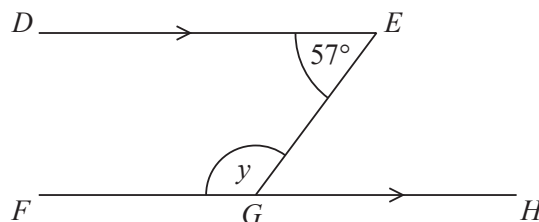
$x = 63^\circ$ because base angles of an isosceles triangle are equal.

Mary is wrong.

(a) Explain why.

(1)

William needs to work out the size of angle y in this diagram.



William writes

Working	Reason
angle $EGH = 57^\circ$	because corresponding angles are equal
$y = 180^\circ - 57^\circ$ $y = 123^\circ$	because angles on a straight line add up to 180°

One of William's reasons is wrong.

(b) Write down the correct reason.

(1)

(Total for Question 15 is 2 marks)

8 Prasha has five blocks of wood.

The total weight of all five blocks of wood is 3 kilograms.

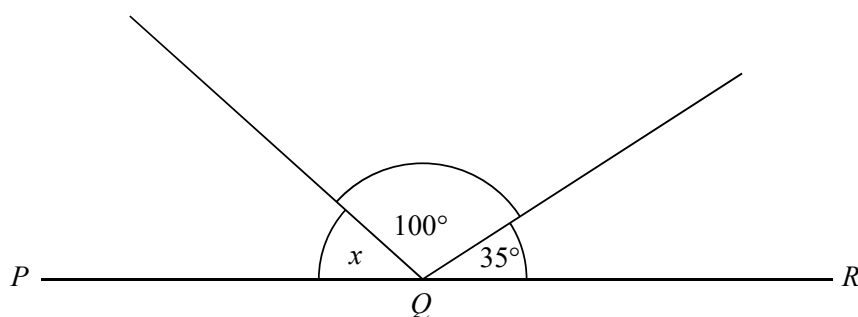
4 of the blocks of wood each have a weight of 650 grams.

Work out the weight, in grams, of the other block of wood.

..... grams

(Total for Question 8 is 3 marks)

9 PQR is a straight line.



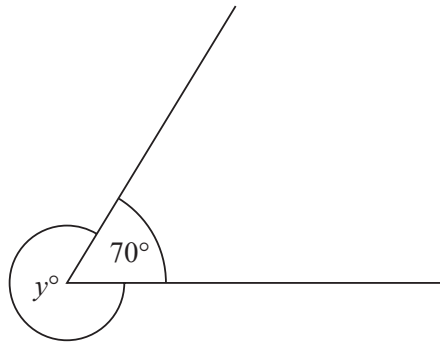
Work out the size of angle x .

.....

(Total for Question 9 is 2 marks)



9



(a) Find the value of y .

$y = \dots\dots\dots$
(1)

(b) Give a reason for your answer.

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

(Total for Question 9 is 2 marks)



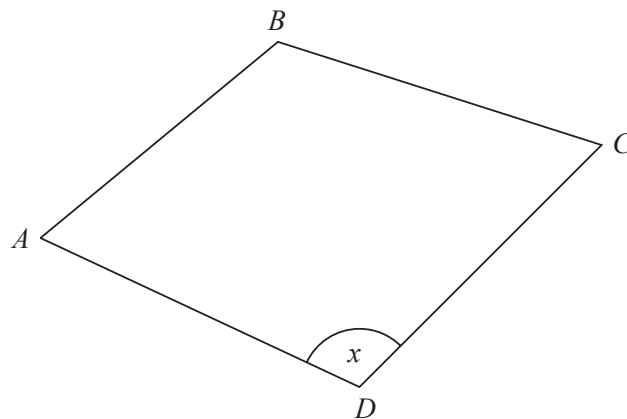
- 5 Here are four cards.
There is a number on each card.



Write down the smallest 4-digit even number that can be made using each card only once.

.....
(Total for Question 5 is 1 mark)

- 6 Here is a quadrilateral $ABCD$.



- (a) Measure the length of the side AB .
Give your answer in centimetres.

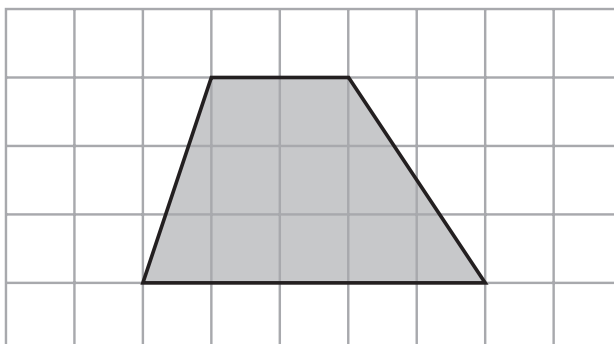
..... centimetres
(1)

- (b) Measure the size of the angle marked x .

.....
(1)

(Total for Question 6 is 2 marks)

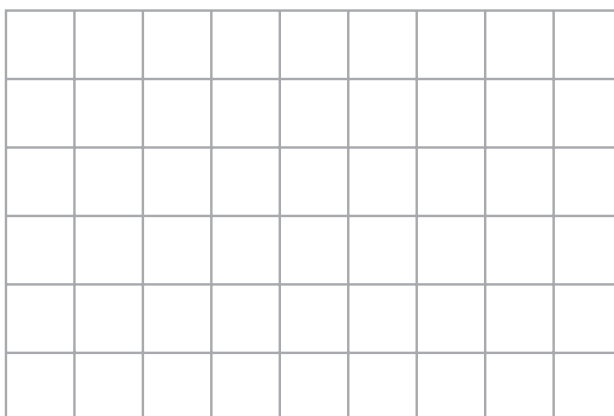
7 Here is a quadrilateral.



(a) Write down the special name for this quadrilateral.

.....
(1)

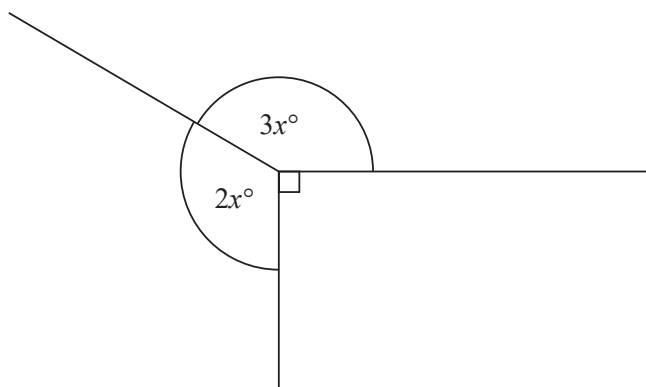
(b) On the grid below, draw a right-angled triangle.



(1)

(Total for Question 7 is 2 marks)

9

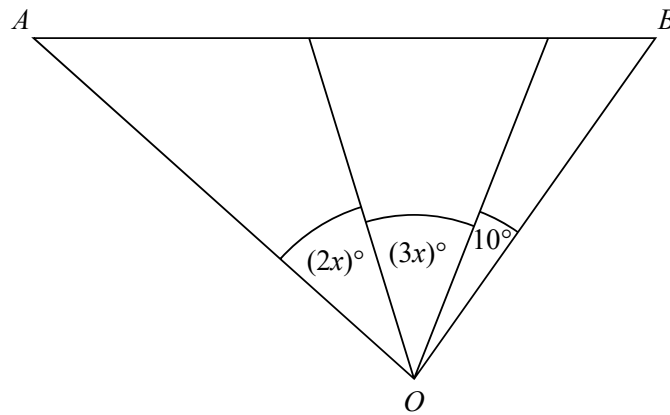


Find the value of x .

(Total for Question 9 is 3 marks)



28 The diagram shows triangle AOB .



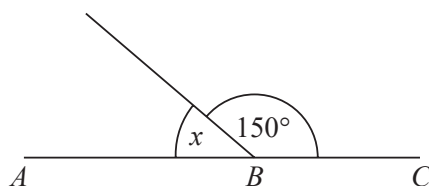
Angle AOB is **not** an obtuse angle.

Find the greatest value of x .

You must show all your working.

.....
(Total for Question 28 is 3 marks)

8



ABC is a straight line.

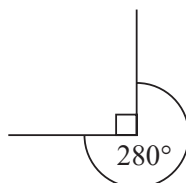
(a) (i) Work out the size of the angle marked x .

.....
(1)

(ii) Give a reason for your answer.

.....
(1)

The diagram below is wrong.



(b) Explain why.

.....
(1)

(Total for Question 8 is 3 marks)



Pam says that the temperature of the liquid drops more in the first 3 minutes of cooling than it does between time 9 minutes and time 12 minutes.

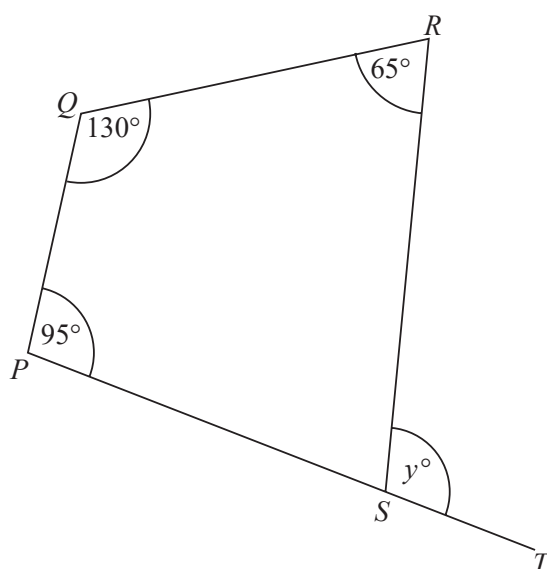
(c) Is Pam correct?

Give a reason for your answer.

(1)

(Total for Question 10 is 3 marks)

- 11 $PQRS$ is a quadrilateral.
 PST is a straight line.



Find the value of y .

$y = \dots\dots\dots$

(Total for Question 11 is 3 marks)



12 (a) Work out $\sqrt{\frac{13.82}{4.06}}$

Write down all the figures on your calculator display.

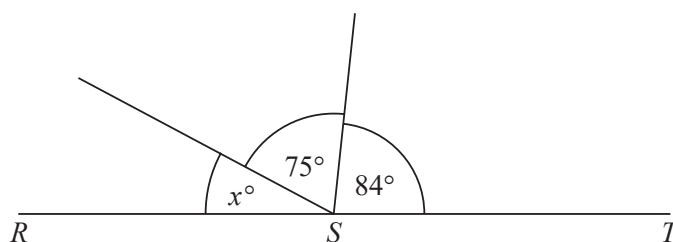
.....
(2)

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

.....
(1)

(Total for Question 12 is 3 marks)

13



RST is a straight line.

(i) Work out the value of x .

.....
(2)

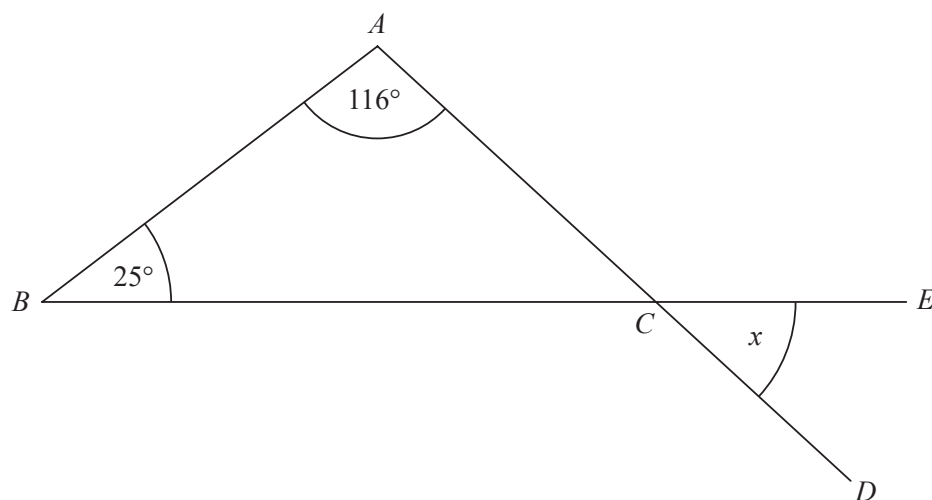
(ii) Give a reason for your answer.

.....
(1)

(Total for Question 13 is 3 marks)



11 The diagram shows a triangle ABC .



ACD and BCE are straight lines.

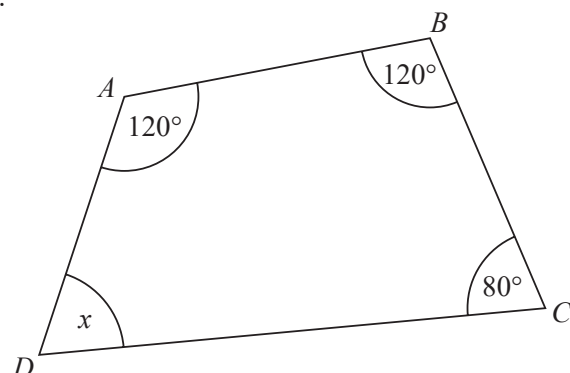
Work out the size of the angle marked x .

Give a reason for each stage of your working.

(Total for Question 11 is 3 marks)



13 $ABCD$ is a quadrilateral.



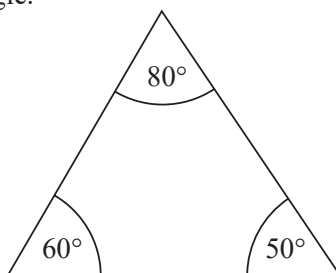
(a) (i) Work out the size of angle x .

.....
(1)

(ii) Give a reason for your answer.

.....
(1)

The diagram below shows a triangle.



The diagram is wrong.

(b) Explain why.

.....
(1)

(Total for Question 13 is 3 marks)

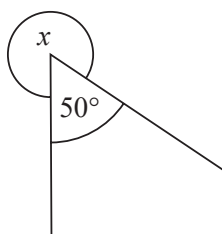


7 Write down **three** different factors of 20

..... , ... , ...

(Total for Question 7 is 2 marks)

8



(a) Work out the size of the angle marked x .

.....
(2)

A student says that an angle of 50° is an obtuse angle.

The student is wrong.

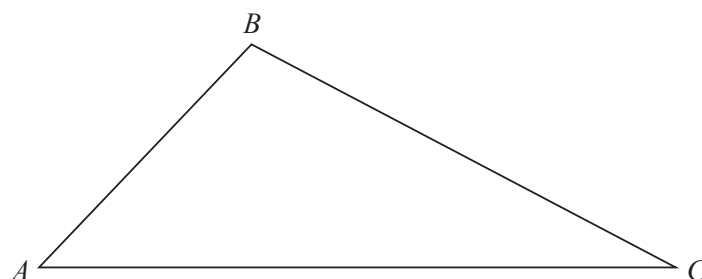
(b) Explain why.

.....
(1)

(Total for Question 8 is 3 marks)



- 7 Here is a triangle.
The triangle is accurately drawn.



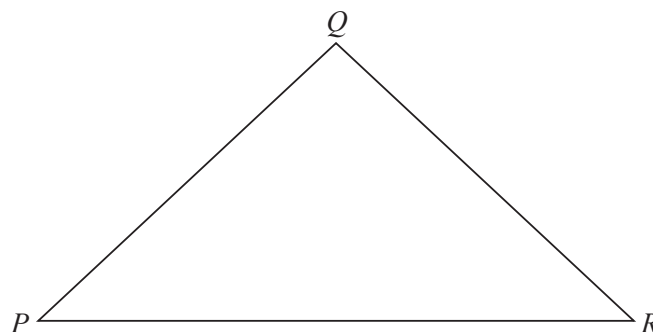
- (a) Measure the length of AC .

..... cm
(1)

- (b) Measure the size of angle B .

..... °
(1)

Here is a different triangle.



$$QP = QR$$

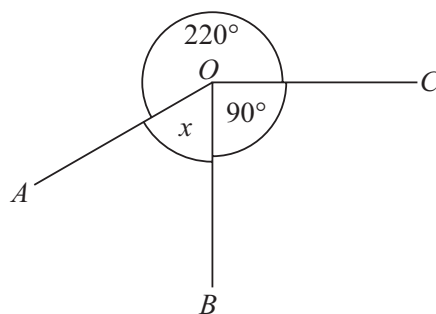
- (c) Write down the mathematical name of this triangle.

.....
(1)

(Total for Question 7 is 3 marks)



8 OA , OB and OC are three straight lines.



(i) Work out the size of the angle marked x .

.....
(2)

(ii) Give a reason for your answer.

.....
(1)

(Total for Question 8 is 3 marks)

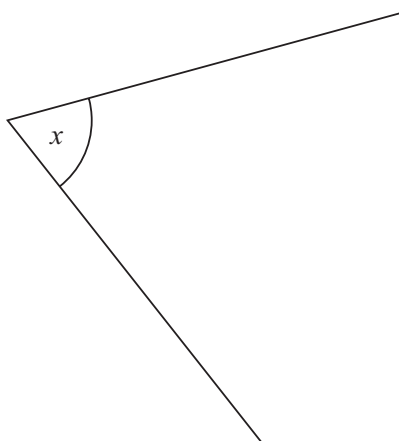


- 7 (a) Measure the length of this line.
Give your answer in centimetres.



..... centimetres
(1)

- (b) Measure the size of the angle marked x .



.....
(1)

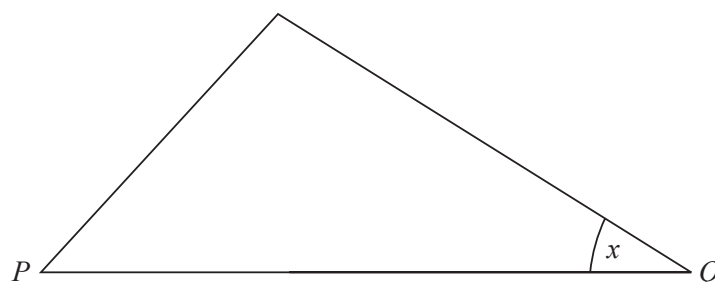
- (c) In the space below, draw a hexagon.

(1)

(Total for Question 7 is 3 marks)



7 Here is an accurately drawn triangle.



- (a) Measure the length of the side PQ .
Give your answer in centimetres.

..... centimetres
(1)

- (b) What type of angle is the angle marked x ?

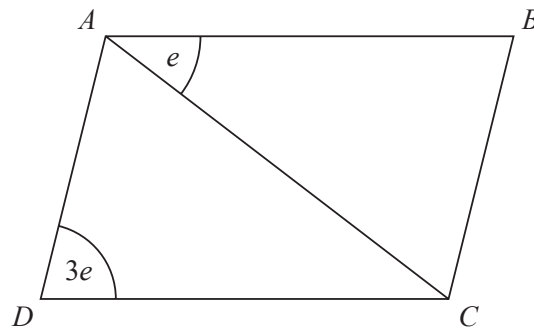
.....
(1)

- (c) Measure the size of the angle marked x .

.....
(1)

(Total for Question 7 is 3 marks)

21 $ABCD$ is a parallelogram.

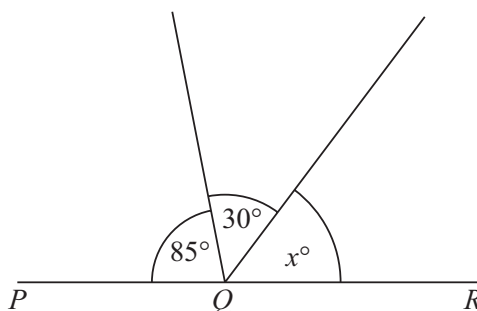


All angles are measured in degrees.

Find an expression, in terms of e , for the size of angle CAD .
Give a reason for each stage of your working.

(Total for Question 21 is 3 marks)

9



PQR is a straight line.

(i) Work out the value of x .

$x = \dots\dots\dots$
(2)

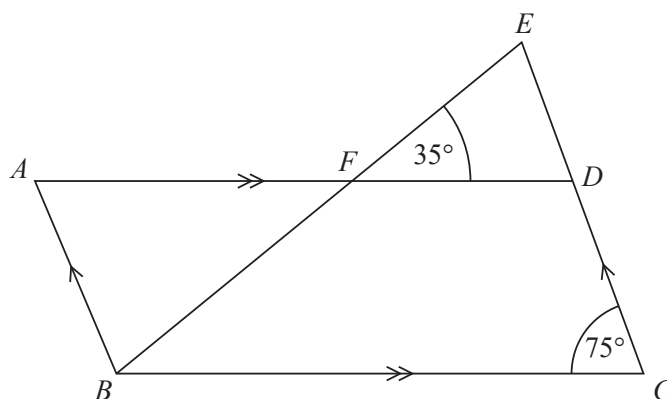
(ii) Give a reason for your answer.

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

(Total for Question 9 is 3 marks)



25



$ABCD$ is a parallelogram.

EDC is a straight line.

F is the point on AD so that BFE is a straight line.

Angle $EFD = 35^\circ$

Angle $DCB = 75^\circ$

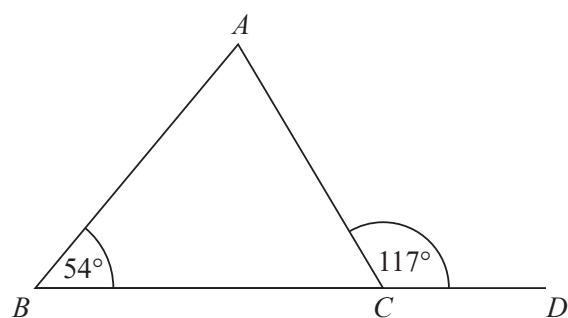
Show that angle $ABF = 70^\circ$

Give a reason for each stage of your working.

(Total for Question 25 is 4 marks)



7



BCD is a straight line.

ABC is a triangle.

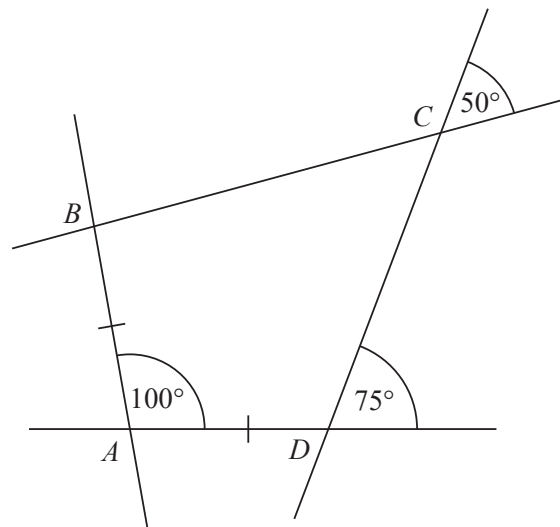
Show that triangle ABC is an isosceles triangle.

Give a reason for each stage of your working.

(Total for Question 7 is 4 marks)



14 The diagram shows quadrilateral $ABCD$ with each of its sides extended.



$$AB = AD$$

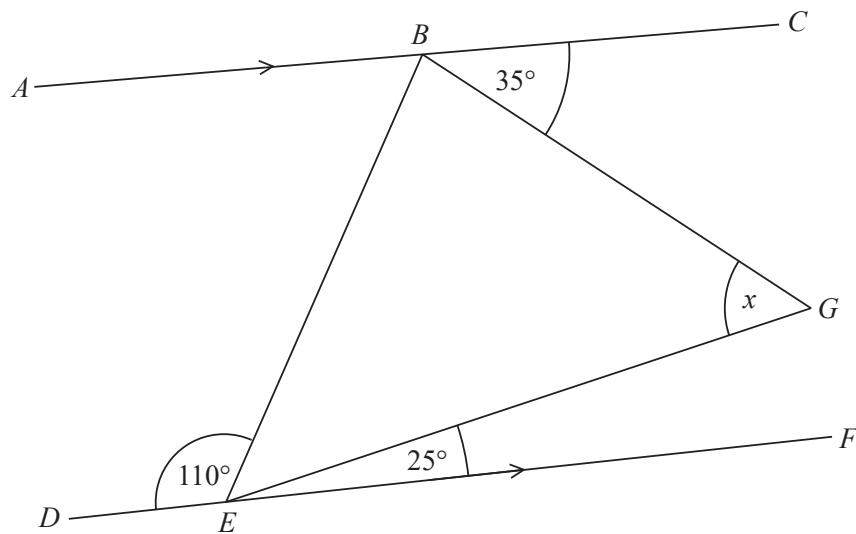
Show that $ABCD$ is a kite.

Give a reason for each stage of your working.

(Total for Question 14 is 4 marks)



22 BEG is a triangle.



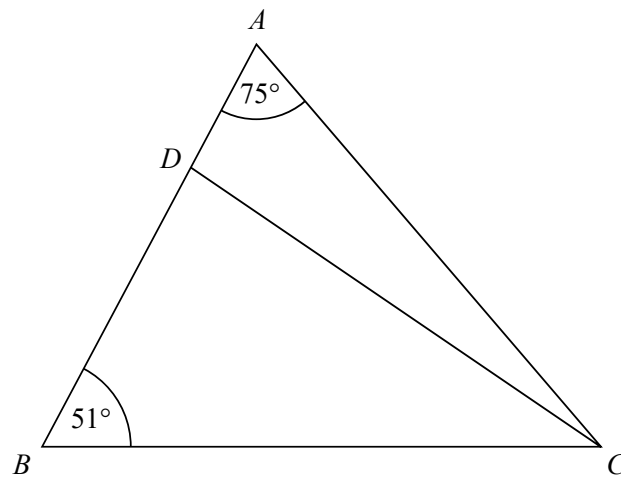
ABC and DEF are parallel lines.

Work out the size of angle x .

Give a reason for each stage of your working.

(Total for Question 22 is 4 marks)

24 The diagram shows triangle ABC .



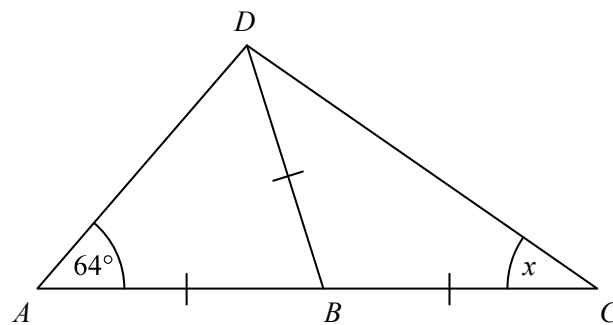
ADB is a straight line.

the size of angle DCB : the size of angle $ACD = 2 : 1$

Work out the size of angle BDC .

(Total for Question 24 is 4 marks)

17



ABC is a straight line.

$AB = BC = BD$.

Angle $DAB = 64^\circ$

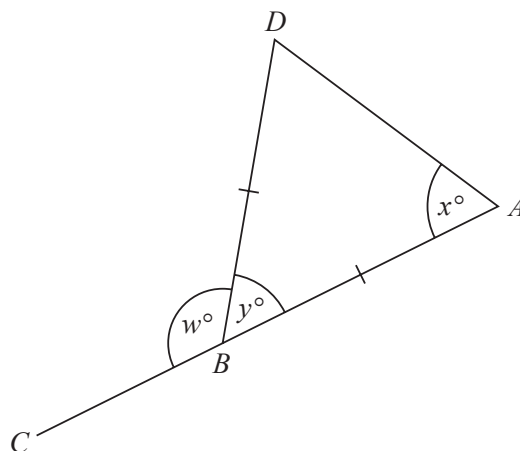
Work out the size of the angle marked x .

Give a reason for each stage of your working.

(Total for Question 17 is 4 marks)



23 The diagram shows an isosceles triangle ABD and the straight line ABC .



$$BA = BD$$

$$x:y = 2:1$$

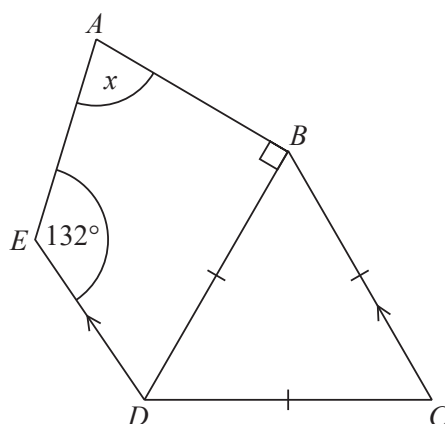
Work out the value of w .

$$w = \dots\dots\dots$$

(Total for Question 23 is 4 marks)



19 The diagram shows a quadrilateral $ABDE$ and an equilateral triangle BCD .



CB is parallel to DE .

Angle $AED = 132^\circ$

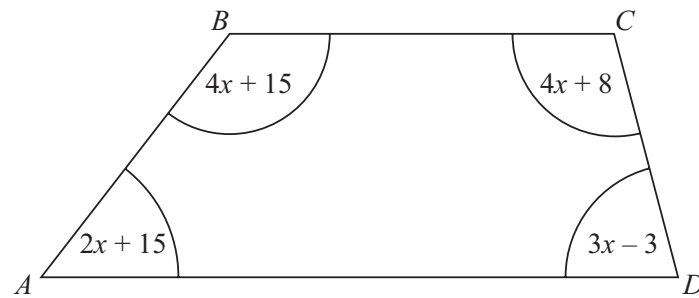
Work out the size of the angle marked x .

You must give a reason for each stage of your working.

(Total for Question 19 is 4 marks)



26 $ABCD$ is a quadrilateral.



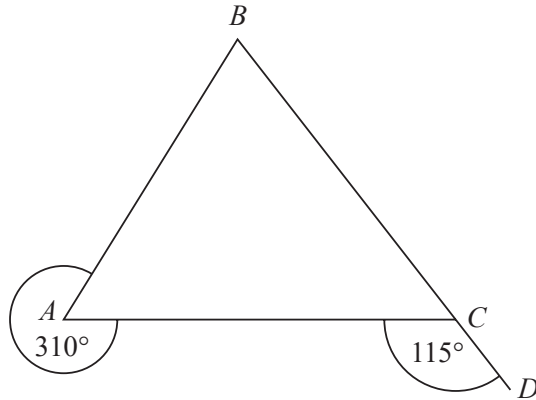
All angles are measured in degrees.

Show that $ABCD$ is a trapezium.

(Total for Question 26 is 4 marks)



13 ABC is a triangle.



BCD is a straight line.

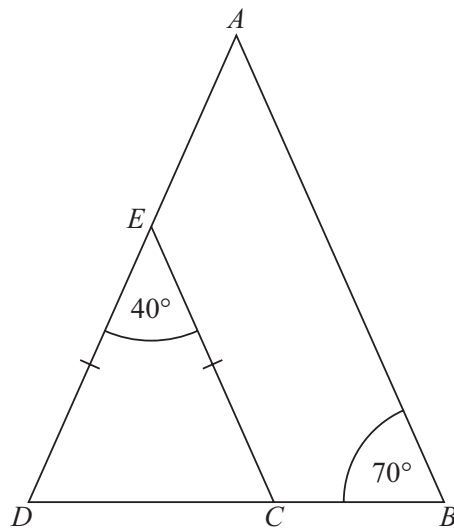
Show that triangle ABC is isosceles.

Give a reason for each stage of your working.

(Total for Question 13 is 4 marks)



16



AED and BCD are straight lines.

$ED = EC$

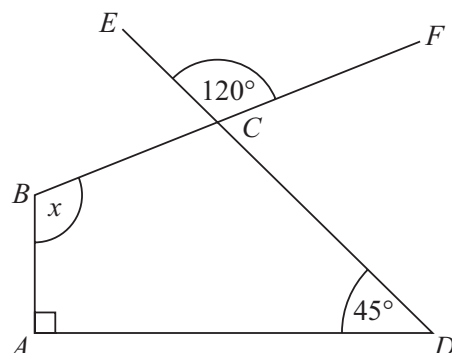
Show that EC is parallel to AB .

Give a reason for each stage of your working.

(Total for Question 16 is 4 marks)



- 13 $ABCD$ is a quadrilateral.
 BCF and DCE are straight lines.



Work out the size of the angle marked x .
Give a reason for each stage of your working.

(Total for Question 13 is 4 marks)

- 13** The size of the largest angle in a triangle is 4 times the size of the smallest angle.
The other angle is 27° less than the largest angle.

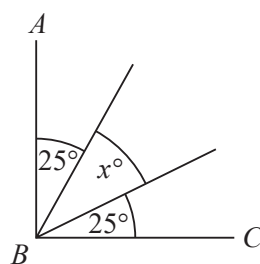
Work out, in degrees, the size of each angle in the triangle.
You must show your working.

.....^o , ...^o , ...^o

(Total for Question 13 is 5 marks)



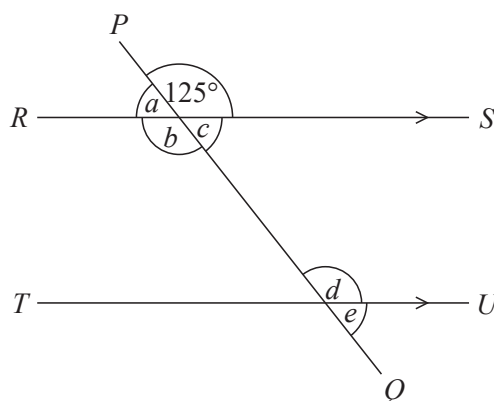
12 AB and BC are perpendicular lines.



(a) Find the value of x .

$x = \dots\dots\dots$
(2)

RS and TU are parallel lines.
 PQ is a straight line.



An angle of size 125° is shown on the diagram.

(b) (i) Write down the letter of one other angle of size 125°
Give a reason for your answer.

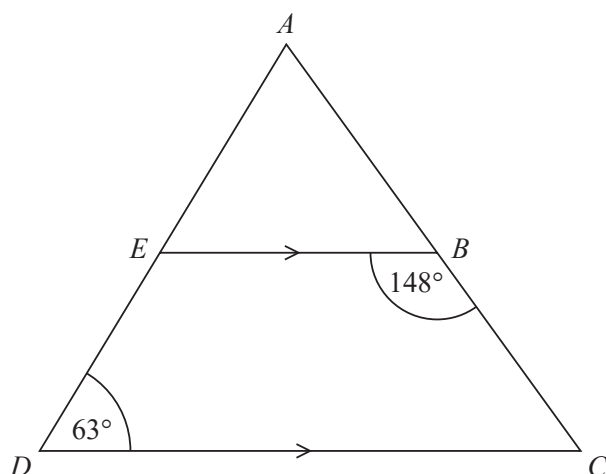
.....
.....
(2)

(ii) Explain why $a + b + c = 235^\circ$

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

(Total for Question 12 is 5 marks)

25 ADC is a triangle.



AED and ABC are straight lines.

EB is parallel to DC .

Angle $EBC = 148^\circ$

Angle $ADC = 63^\circ$

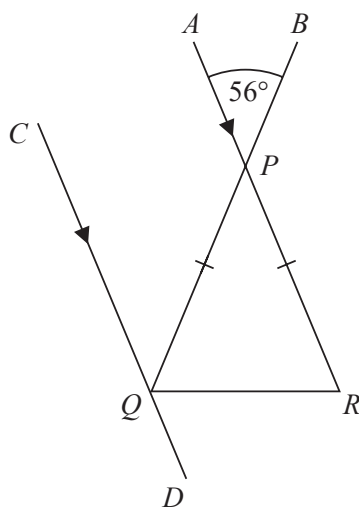
Work out the size of angle EAB .

You must give a reason for each stage of your working.

(Total for Question 25 is 5 marks)



20 In the diagram, PQR is an isosceles triangle with $PQ = PR$.



APR and CQD are parallel lines.

BPQ is a straight line.

Angle $APB = 56^\circ$

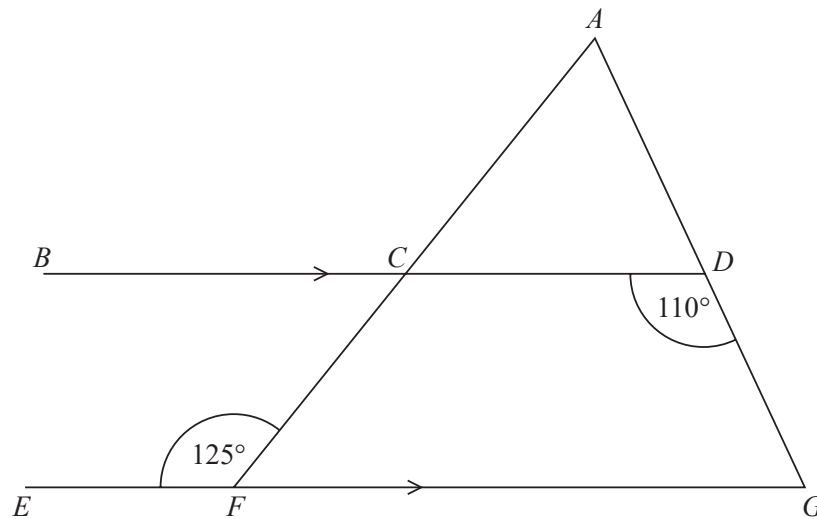
Work out the size of angle CQR .

Give a reason for each stage of your working.

(Total for Question 20 is 5 marks)



- 22 ACF and ADG are straight lines.
 BCD and EFG are parallel lines.

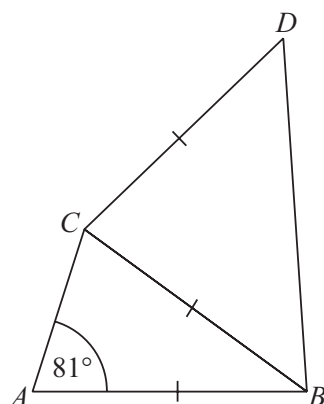


Show that triangle ACD is isosceles.
Give a reason for each stage of your working.

(Total for Question 22 is 5 marks)



20 ABC and BCD are isosceles triangles.



$$AB = BC = CD$$

$$\text{Angle } CAB = 81^\circ$$

$$\text{Angle } BCD = 4 \times \text{angle } ABC$$

Find

the size of angle ABC : the size of angle CBD

Give your answer in the form $1:n$

You must show all your working.

(Total for Question 20 is 5 marks)



SUB-TOPIC G1b

POLYGONS & PROPERTIES OF SHAPES

Sub-topic G1b · 21 questions · 57 marks · lowest tariff first



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

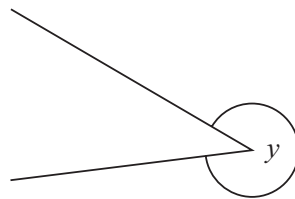
- 1 Write the number 18475 correct to the nearest thousand.

.....
(Total for Question 1 is 1 mark)

- 2 Write 0.3 as a percentage.

..... %
(Total for Question 2 is 1 mark)

- 3 Write down the mathematical name for the type of angle marked y .



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

- 4 Write these numbers in order of size.
Start with the smallest number.

0.21 0.2 0.03 0.1 0.16

.....
(Total for Question 4 is 1 mark)

- 5 Find the square root of 64

.....
(Total for Question 5 is 1 mark)



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Write 17% as a fraction.

.....
(Total for Question 1 is 1 mark)

- 2** Write 140 minutes in hours and minutes.

..... hours minutes

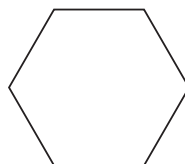
(Total for Question 2 is 1 mark)

- 3** Write these numbers in order of size.
Start with the smallest number.

0.57 0.507 0.5 0.05

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

- 4** Write down the mathematical name of this polygon.



.....
(Total for Question 4 is 1 mark)

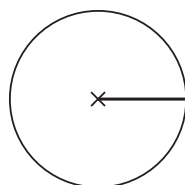
- 8 3 kg of meat costs £54
Nina buys 2 kg of the meat.

Work out how much Nina pays.

£

(Total for Question 8 is 2 marks)

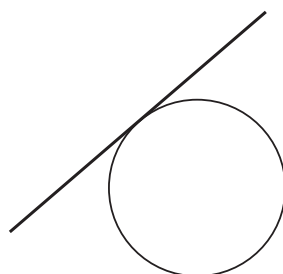
- 9 The centre of this circle is marked with a cross (×).



- (a) Write down the mathematical name of the straight line shown in the circle.

.....
(1)

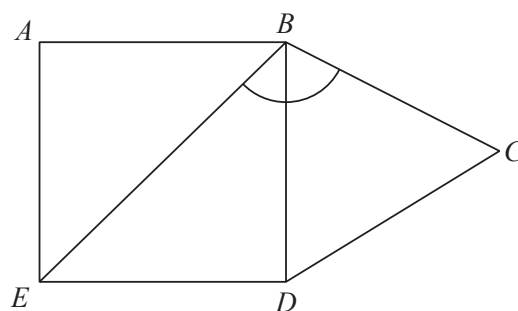
- (b) Write down the mathematical name of the straight line that is touching the circle.



.....
(1)

(Total for Question 9 is 2 marks)

- 20 The diagram shows a square $ABDE$ and an equilateral triangle BCD .



Work out the size of angle EBC .

(Total for Question 20 is 2 marks)

28 Each exterior angle of a regular polygon is 15°

Work out the number of sides of the polygon.

.....
(Total for Question 28 is 2 marks)

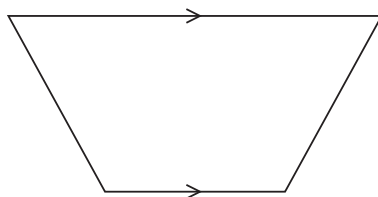
29 Write down the gradient of the line with equation $y = 2x + 3$

.....
(Total for Question 29 is 1 mark)

TOTAL FOR PAPER IS 80 MARKS

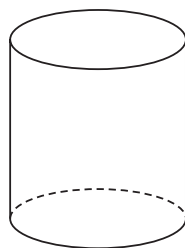


- 6 (a) Write down the mathematical name of this quadrilateral.



.....
(1)

- (b) Write down the mathematical name of this 3-D shape.



.....
(1)

(Total for Question 6 is 2 marks)

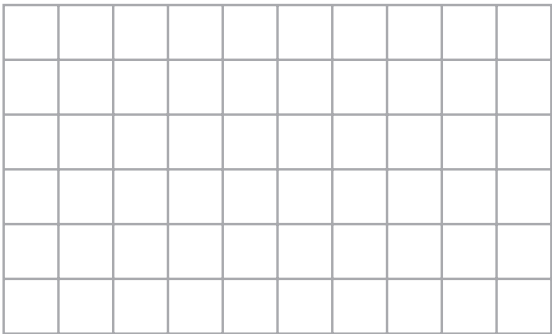
- 7 £42 is shared equally between 3 friends.

How much does each friend get?

£.....

(Total for Question 7 is 2 marks)

6



On the grid, draw a quadrilateral with
no lines of symmetry
and rotational symmetry of order 2

(Total for Question 6 is 2 marks)

7 The table shows the total number of apples sold and the total number of oranges sold in a shop in each of three weeks.

	Week 1	Week 2	Week 3
Number of apples	86	75	92
Number of oranges	68	80	76

In total for the three weeks, more apples than oranges were sold.
How many more?

(Total for Question 7 is 3 marks)



8 Here are the first five terms of a number sequence.

3 8 13 18 23

(a) Write down the next two terms of this sequence.

.....
(1)

Jim says that 50 is a term in this sequence.

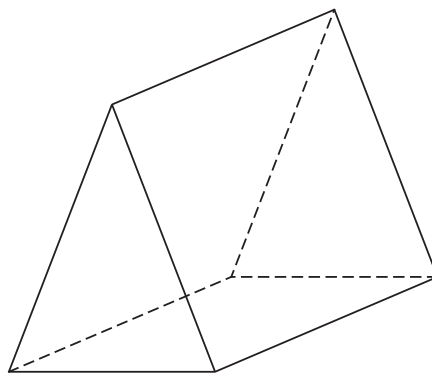
Jim is wrong.

(b) Explain why.

.....
(1)

(Total for Question 8 is 2 marks)

9 The diagram shows a solid triangular prism.



(a) Write down the number of faces of the prism.

.....
(1)

(b) Write down the number of edges of the prism.

.....
(1)

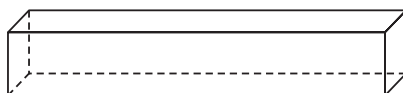
(Total for Question 9 is 2 marks)

8 A quadrilateral has 4 right angles and 4 sides of equal length.

(a) Write down the mathematical name of this quadrilateral.

.....
(1)

The diagram shows a solid shape.



(b) Write down the mathematical name of this shape.

.....
(1)

(Total for Question 8 is 2 marks)

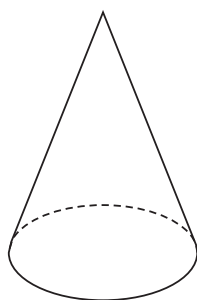
- 6 Lydia works for 4 hours.
She is paid £50

How much is Lydia paid per hour?

£.....

(Total for Question 6 is 2 marks)

- 7 Here is a 3-D shape.



- (a) Write down the name of this 3-D shape.

.....
(1)

- (b) In the space below, draw a sketch of a triangular prism.

(1)

(Total for Question 7 is 2 marks)

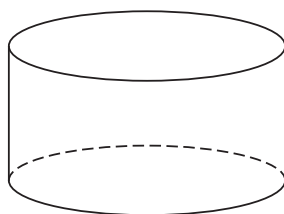
- 8 The diagram shows two sides of a kite.



- (a) On the grid, complete the kite.

(1)

- (b) What is the mathematical name of this solid shape?



(1)

(Total for Question 8 is 2 marks)

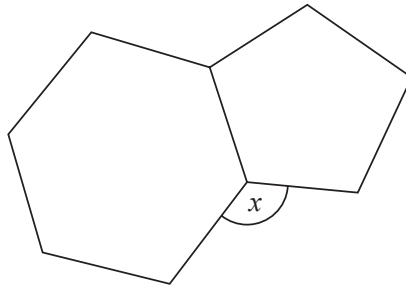
- 28 The size of each interior angle of a regular polygon is 11 times the size of each exterior angle.
Work out how many sides the polygon has.

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS



27 Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x .
You must show all your working.

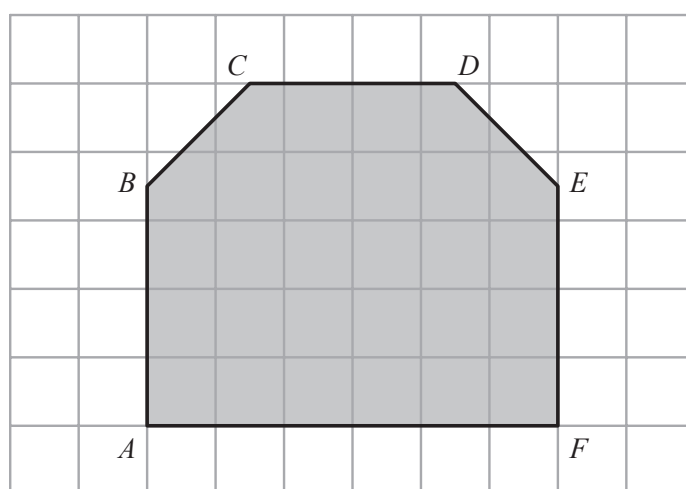
(Total for Question 27 is 3 marks)

- 6 Write the following numbers in order of size.
Start with the smallest number.

-11 -2 8 -7 3 10

(Total for Question 6 is 1 mark)

- 7 Here is polygon $ABCDEF$ on a square grid.



- (a) Write down the mathematical name of the polygon.

(1)

- (b) Which side of the polygon is parallel to the side CD ?

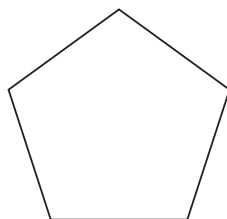
(1)

- (c) Write down a side of the polygon that is perpendicular to the side AF .

(1)

(Total for Question 7 is 3 marks)

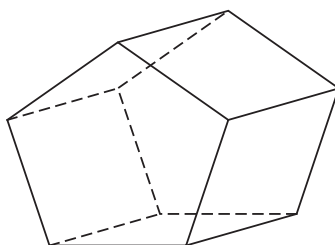
10 Here is a polygon.



(a) Write down the mathematical name of this polygon.

.....
(1)

Here is a prism.



Each edge of the prism has a length of 7.5 cm.

(b) Work out the total length of the edges of the prism.

..... cm
(2)

(Total for Question 10 is 3 marks)

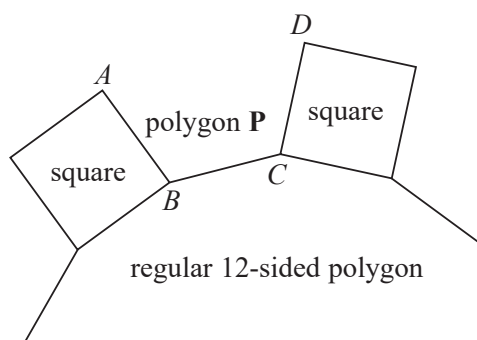
11 There are only red counters, blue counters and green counters in a bag.

number of red counters : number of blue counters : number of green counters = 2 : 16 : 7

What fraction of the counters in the bag are green counters?

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

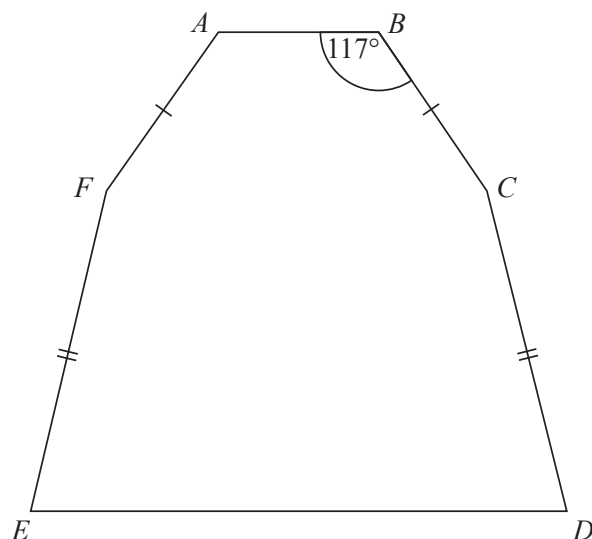
19 In the diagram, AB , BC and CD are three sides of a regular polygon **P**.



Show that polygon **P** is a hexagon.
You must show your working.

(Total for Question 19 is 4 marks)

- 28 The diagram shows a hexagon.
The hexagon has one line of symmetry.



$$FA = BC$$

$$EF = CD$$

$$\text{Angle } ABC = 117^\circ$$

$$\text{Angle } BCD = 2 \times \text{angle } CDE$$

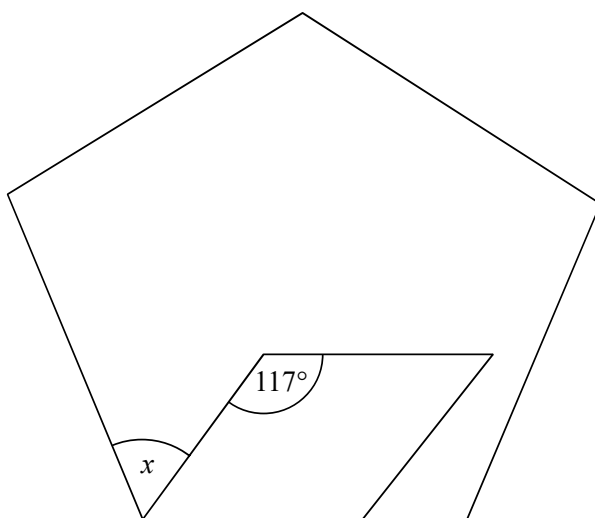
Work out the size of angle AFE .

You must show all your working.

(Total for Question 28 is 4 marks)



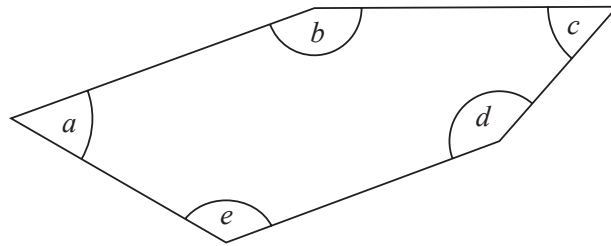
29 The diagram shows a regular pentagon and a parallelogram.



Work out the size of the angle marked x .
You must show all your working.

(Total for Question 29 is 4 marks)

23 Here is a pentagon.



Angle a = angle c

Angle $b = 155^\circ$

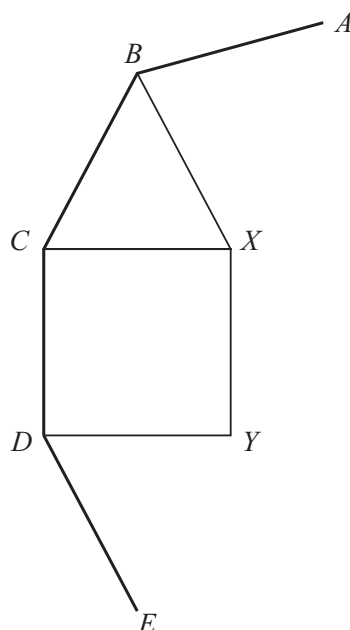
Angle d is three times the size of angle c

Angle e is two times the size of angle c

Work out the size of angle a

(Total for Question 23 is 4 marks)

24 AB , BC , CD and DE are four sides of a regular polygon with n sides.



BCX is an equilateral triangle.

$CDYX$ is a square.

Work out the value of n .

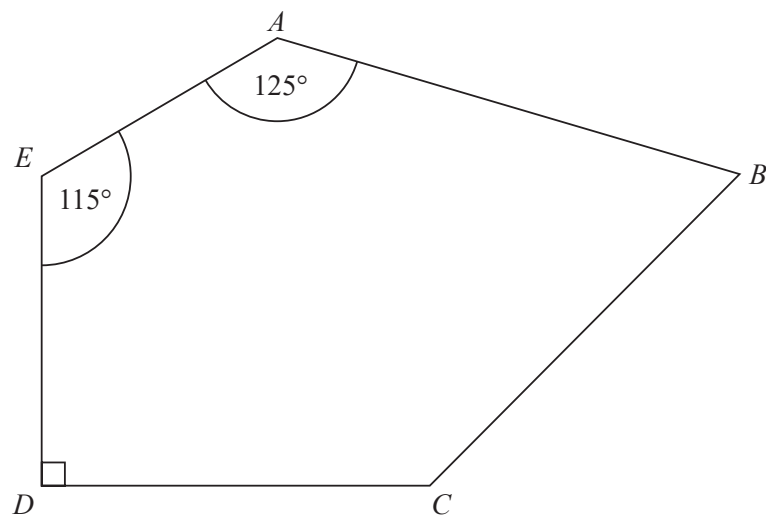
You must show all your working.

$n = \dots\dots\dots$

(Total for Question 24 is 4 marks)



26 $ABCDE$ is a pentagon.



Angle $BCD = 2 \times \text{angle } ABC$

Work out the size of angle BCD .
You must show all your working.

(Total for Question 26 is 5 marks)



SUB-TOPIC G1c

BEARINGS

Sub-topic G1c · 7 questions · 23 marks · lowest tariff first



17 The diagram shows the position of town T .



Town R is 55 km from town T on a bearing of 065°

Mark the position of town R with a cross ($\times$).

Use a scale of 1 cm to 10 km.

(Total for Question 17 is 2 marks)



- 26** Chris, Debbie and Errol share some money in the ratio 3:4:2
Debbie gets £120

Chris then gives some of his share to Debbie and some of his share to Errol.
The money that Chris, Debbie and Errol each have is now in the ratio 2:5:3

How much money did Chris give to Errol?

£.....

(Total for Question 26 is 4 marks)

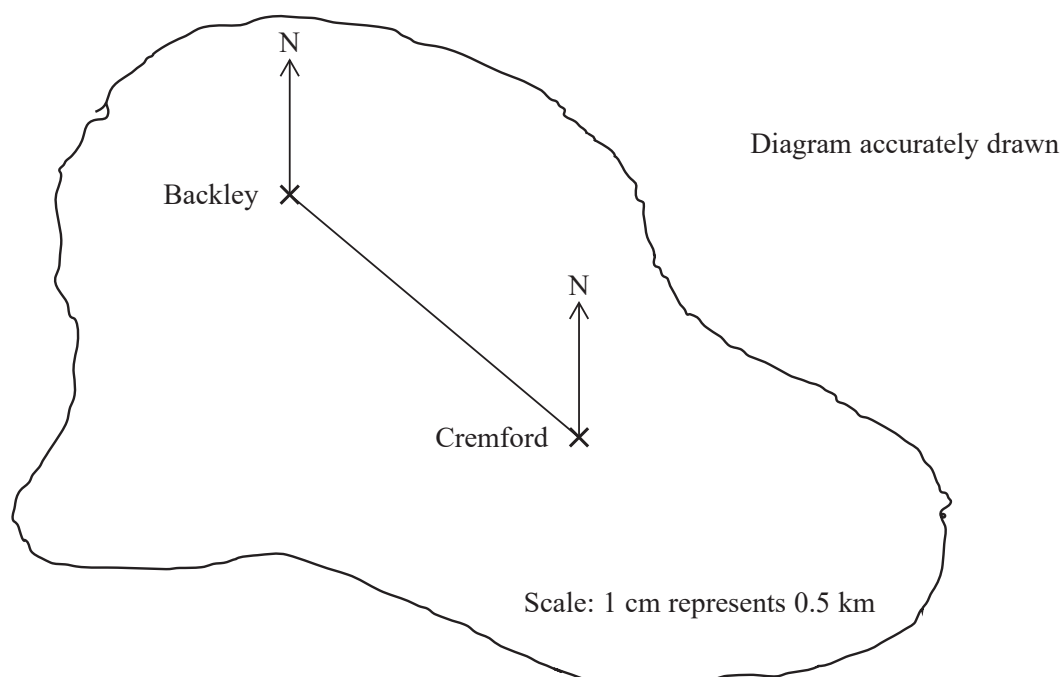
- 27** The bearing of port B from port A is 147°
Work out the bearing of port A from port B .

o

(Total for Question 27 is 2 marks)



9 Here is a map of an island.



A straight road joins the two villages, Backley and Cremford.

(a) Work out the real distance between the two villages.

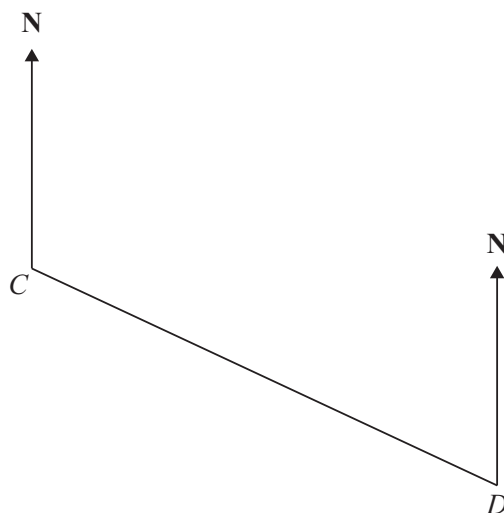
..... km
(2)

(b) Find the bearing of Cremford from Backley.

..... °
(1)

(Total for Question 9 is 3 marks)

14 The accurately drawn diagram shows two points, C and D , on a map.



(a) Find the bearing of D from C .

.....
(1)

The scale of the map is 1 cm represents 4 km.

(b) Work out the real distance from C to D .

..... km
(2)

(Total for Question 14 is 3 marks)



13 The diagram shows two points, A and B , on a map.

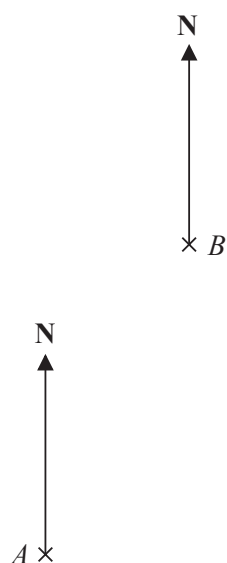


Diagram accurately drawn

Scale: 1 to 25 000

(a) Find the bearing of B from A .

.....
(1)

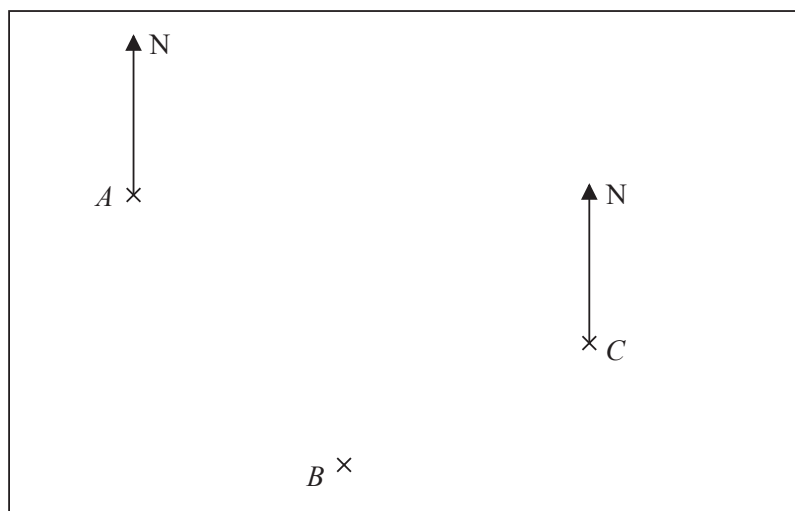
(b) Work out the real distance between A and B .
Give your answer in kilometres.

..... kilometres
(3)

(Total for Question 13 is 4 marks)



13 The accurately drawn map shows the positions of three points, A , B and C , in a field.



Scale: 1 cm represents 150 metres

Parveen walks in a straight line from A to B .
She then walks in a straight line from B to C .

Susan walks in a straight line from A to C .

Parveen walks more metres than Susan.

(a) How many more?

..... metres
(3)

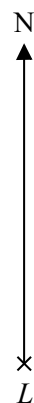
(b) Find by measurement the bearing of A from C .

.....
(1)

(Total for Question 13 is 4 marks)



27 The accurate scale drawing shows the positions of port P and a lighthouse L .



Scale: 1 cm represents 4 km.

Aleena sails her boat from port P on a bearing of 070°

She sails for $1\frac{1}{2}$ hours at an average speed of 12 km/h to a port Q .

Find

- the distance, in km, of port Q from lighthouse L ,
- the bearing of port Q from lighthouse L .

distance $QL = \dots\dots\dots$ km

bearing of Q from $L = \dots\dots\dots^\circ$

(Total for Question 27 is 5 marks)



MARK SCHEMES

official mark schemes, in the same order as the questions



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
13 (a)	40	M1	$2 \div (2+3) \times 100 (=40)$ or build up to (and shows) 40:60 oe	
			or for sight of $\frac{2}{5}$ oe or $100 \div 5 (=20)$	
		A1	cao	
(b)	20 : 80	M1	$100 - 20 (=80)$ or $80 : 20$ oe	Accept any equivalent ratio; award full marks if an acceptable ratio is given and then incorrectly simplified.
		A1	20 : 80 oe	
14	80	P1	for $1 - \frac{13}{15} \left(= \frac{2}{15} \right)$ or $\frac{13}{15} \times 600$ (million) (= 520 (million))	Condone no million or may see 000 000 used* *In this case condone up to two missing 0s for the award of the P marks. For P marks accept $\frac{13}{15}$, $\frac{2}{15}$ rounded or truncated to no less than 2dp.
		P1	for " $\frac{2}{15}$ " $\times 600$ (million) (= 80 (million)) or $600 - "520"$ (=80) oe	
		A1	Accept 80 000 000	
15	Explanation	C1	for explanation Acceptable examples They do not add to 360 They add to 100 too least It is missing a 100 angle / It needs 100 more Because the total has to be 360 A whole circle is 360 Not acceptable examples They add up to 260 One of the angles is wrong A shape with 4 angles adds up to 360	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	6	B1	cao	
2	31	B1	cao	
3	$12a$	B1		
4	40	B1	accept answer in the range 38 to 42	
5	60	B1	cao	
6	2300	P1 P1 A1	for converting to millilitres or litres eg $3 \times 1000 (= 3000)$ or $700 \div 1000 (= 0.7)$ for finding the difference eg $[3000] - 700$ or $3 - [0.7] (= 2.3)$ accept 2.3 litres	Process marks may be awarded in either order [3000] comes from 3×1000 or can be 30 or 300 or 30000 [0.7] comes from $700 \div 1000$ or can be 7 or 70
7 (a)	15	B1	cao	
(b)	4	B1	cao	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	5e	B1	cao	
2	0.75	B1	cao	
3	6	B1	cao	
4	32	B1	cao	
5	Acute	B1	cao	
6 (a)	42	B1	cao	
(b)	Yes (supported)	P1	for a start to a process to find figures to compare, eg $33 + 40 + 27 (= 100)$ or $20 + 14 + 15 (= 49)$ or $(33 - 20) + (40 - 14) + (27 - 15) (= 51)$	
		P1	for complete process to give figures to compare, eg $33 + 40 + 27 (= 100)$ and $20 + 14 + 15 (= 49)$ and $"49" \times 2 (= 98)$ or $33 + 40 + 27 (= 100)$ and $20 + 14 + 15 (= 49)$ and $"100" \div 2 (= 50)$ or $33 + 40 + 27 (= 100)$ and $20 + 14 + 15 (= 49)$ and $"100" - "49" (= 51)$ or $33 + 40 + 27 (= 100)$ and $20 \times 2 + 14 \times 2 + 15 \times 2 (= 98)$ or $(33 - 20) + (40 - 14) + (27 - 15) (= 51)$ and $20 + 14 + 15 (= 49)$	
		C1	for Yes with correct supporting figures, eg 100 and 98 or 50 and 49 or 100 and 49 and 51 or 51 and 49	



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
13	$\frac{338}{350}$	M1 A1	for $350 - 12 (=338)$ or $\frac{y}{350}$ oe where $y < 350$ and $y \neq 12$ or $1 - \frac{12}{350}$ oe oe	For the method mark probability fractions can be expressed as equivalent expressions, even if not correct probability notation eg. $338 : 350$ scores M1 A0 Using correct probability notation Allow 0.96 to 0.97 or 96% to 97%
14	45 22 18 7 23 16	C1 C1 C1	for correctly placing at least one piece of data (22 or 16) OR for finding at least one unknown piece of data (4, 18, 7 or 23) for correctly placing at least one piece of data (22 or 16) and for finding at least one unknown piece of data (4, 18, 7 or 23) for a complete correct tree. SC C2 if all 6 figures are shown as the numerator of fractions in the correct places	Unknown figures may be seen in working and need not be on the diagram Award of this mark implies the first C1
15	(a) Correct evaluation (b) Correct or corrected reasoning given	C1 C1	for explanation eg x is not a base angle or states $x = 54^\circ$ eg (because) alternate angles are equal, or Allied angles / Co-interior angles add up to 180 or they are not corresponding (they are alternate) OR selects correct reason used by William	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
8	400	P1 P1 A1	for finding the total weight of 4 blocks, eg $650 \times 4 (= 2600)$ or $0.65 \times 4 (= 2.6)$ or for using $1 \text{ kg} = 1000\text{g}$ eg $650 \div 1000 (= 0.65)$ or $3 \times 1000 (= 3000)$ for subtraction, eg. $3 \times 1000 - "2600"$ or $3 - "2.6" (= 0.4)$ cao SC B1 for 2350	Writing 1 kg as 1000g is insufficient without it being used in a calculation
9	45	M1 A1	for $180 - (100 + 35)$ oe cao	Answer may be written on the diagram.
10	(a) A plotted at (3, 2) (b) (-1, 0)	B1 B1	cao cao	Accept a cross or dot or A written at (3, 2) with or without labelling provided not ambiguous Could be shown on the diagram
11	HHH HHT HTH HTT THH THT TTH TTT	M1 A1	for at least 4 correct different combinations for fully correct list with no extras or repeats	Accept words or unambiguous abbreviations For M1 ignore extras or repeats;

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
7 (a)	A	B1	cao	
(b)(i)	Cross at correct position	B1	for cross at $\frac{1}{4}$	Cross or other indication may be seen on or near line provided within tolerance
(b)(ii)	$\frac{1}{8}$	B1	for $\frac{1}{8}$ oe	Accept any equivalent fraction, decimal form 0.125 or percentage form 12.5% Do not accept 1 : 8 or 1 to 8 or 1 out of 8
8 (a)	7	B1	cao	
(b)	6	M1 A1	for $4n$ ($= 24$) or $24 \div 4$ cao	
9 (a)	290	B1	cao	Accept 290°. May be seen on diagram provided no ambiguity
(b)	reason	C1	for correct reason: <u>Angles</u> at a <u>point</u> add to 360	The key words underlined must be present with the 360 implied if not stated by use in part (a)



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	-7, -2, -1, 0, 7	B1	cao	Accept reverse order
2	$\frac{37}{100}$	B1	oe fraction	
3	13	B1	cao	
4	530	B1	cao	
5	3476	B1	cao	
6 (a)	4.5	B1	accept answer in the range 4.3 to 4.7	
(b)	110	B1	accept answers in the range 108 to 112	
7	49.01	P1 P1 B1 A1	for process to work with the number of miles, eg $12845 - 12468 (= 377)$ or $12845 \times 13 (= 166985)$ or $12468 \times 13 (= 162084)$ for process to find the cost, eg $377 \times 13 (= 4901)$ or $166985 - 162084 (= 4901)$ (indep) for converting from pence to pounds, eg $4901 \div 100$ or $13 \div 100$ or miles divided by 100 eg $377 \div 100 (= 3.77)$ or $12845 \div 100 (= 128.45)$ and $12468 \div 100 (= 124.68)$ 49 or 49.01	This mark can be awarded at any stage in the process
8	315	M1 A1	for 45×7 cao	



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	700	B1		Accept 7 hundreds
2	16	B1	cao	
3	Any two correct 1, 2, 4, 8, 16	B1	two correct and no incorrect	Allow more than two factors but all must be correct
4	-7, -3, 0, 4, 6	B1	accept in reverse order eg 6, 4, 0, -3, -7	
5	1.5	B1	oe eg $\frac{3}{2}$, $1\frac{1}{2}$	
6	(a) 5	B1	cao	
	(b) 17	B1	cao	
	(c) 8	B1	cao	
7	(a) Trapezium	B1	cao	Allow 88 – 92° for the right angle
	(b) Drawn	B1	for a right-angled triangle drawn	



Paper 1MA1: 2F				
Question	Working	Answer	Mark	Notes
5 (a)		Monday wrong	C1	for seeing difference in tally marks and frequency for Monday
(b)		Comment	C1	for suitable comment, eg extra picture for Tuesday needed or explains that 0.5 of a CD is not possible
6		268.20	P1	for a process to work out the value of the £1 coins, eg. $495 \div 3 (= 165)$ or $495 \times 0.33...$ or of the 50p coins, eg. $124 \div 2 (= 62)$
			P1	for process to find the number of 20p coins, eg. $(495 - 124 - ("165")) (= 206)$
			P1	for complete process to find total value using consistent units., eg. $(("165") + (124 \div 2) + ("206" \times 0.2))$ or $165 + 62 + 41.2$
			A1	cao (accept 268.2)
7		0.985	B1	oe
8 (a)		25	B1	for 25 (accept 5^2)
(b)		24	B1	cao
(c)		23, 29	B1	for 23 and 29 and no extras
9		54	M1	for method to form equation, eg $90 + 2x + 3x = 360$ or for $360 - 90 (= 270)$
			M1	for $5x = 360 - 90$ or for $2x + 3x = 360 - 90$ or for $2x = 108$ or for $3x = 162$ or for $270 \div 5$
			A1	cao



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
28	16	P1	for process to formulate an equation or inequality, eg $2x + 3x + 10 = 90$ or for $90 - 10$	*denotes an equality or inequality symbol Accept equivalent forms
		P1	for a process to solve the equation or inequality by isolating terms in x , eg $5x = 90 - 10$ or for $(90 - 10) \div 5$	Award P2 for an embedded answer of 16, which could be shown on the diagram as 32, 48, (10) or written as x embedded in working in an equation.
		A1	cao SC B1 for $x = 34$ or for a value in the range $15 \leq x < 16$	
29 (a)	6	M1	for stating a similar triangle relationship eg $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{CB}{RQ}$ or equivalent set of similar triangle expressions or for substitution giving a fraction form for a scale factor eg $\frac{10}{15} \left(= \frac{2}{3} \right)$ or $\frac{15}{10} \left(= \frac{3}{2} \right)$ or $\frac{9}{15} \left(= \frac{3}{5} \right)$ or $\frac{15}{9} \left(= \frac{5}{3} \right)$	Accept any equivalent fractions or decimal equivalents given to at least 2 dp truncated or rounded
		A1	cao	
	(b)	P1	for showing understanding of the properties of congruent triangles by finding an unknown length using matching of two sides, eg EG, KG and 6, or HG, FG and 4 or matching corresponding angles eg HEG with FKG and EHG with KFG	Can be shown by any complete statements that are unambiguous
		A1	cao	Can be shown in working using algebraic statements, or given by unambiguous marking on the diagram to confirm the relationship.

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
8	(a)(i) 30	B1	cao	
	(ii) Reason	C1	reason, eg <u>angles</u> on a straight <u>line</u> add up to 180°	
	(b) Explanation	C1	for explanation eg the two angles don't add up to 360 Acceptable examples $90 + 280 = 370$ The two angles don't add up to 360 280 should be 270 Angles around a point equal 360° It should be 360 (in a circle) It should be 80 It should not be a right angle It cannot be 280° Not acceptable examples They don't add up to 180 365 degrees in a circle $\square$ means 90 degrees	
9	(a) 25	B1	for 25, accept answer in range 24 to 26	
	(b) 24	M1	for $40 \div 10 \times 6$	
	(c) Comment	A1 C1	cao (dep B1 or M1) ft for comment for their results, eg the two answers are quite close or answer to (b) is less than answer to (a) or the rule gives a smaller answer	
10	(a) 12	B1	cao	
	(b) 4	B1	cao	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
9	(a) 30	B1	cao	
	(b) 42	B1	cao	
	(c) $\frac{1}{20}$	B1	for $\frac{1}{20}$ or any equivalent fraction or 0.05	
10	(a) 80	B1	cao	“Yes” may be implied from wording Ignore any references to actual readings from the graph
	(b) 8	B1	cao	
	(c) Yes and reason	C1	for yes and reason Acceptable examples Yes, because 27 is greater than 7 Yes, because the drop is 20 more Yes, the gradient is steeper (in the first 3 mins) and is then less steep (in the last 3 mins) Yes, because the drop is 20 less in the last 3 mins Yes, because the drop is more Not acceptable examples No Yes, because the drop is 20 less	
11	110	M1	for use of angles in a quadrilateral add to 360° , eg $360 - 130 - 95 - 65 (= 70)$	May be seen in diagram or as a sum to 360°. (130 + 95 + 65) – 180 gains M2
		M1	for $180 - “70”$ or for $(130 + 95 + 65) - 180$	
		A1	cao	



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	1.844977205	M1	for 3.403(940887) or 3.717(526059) or 2.014(944168) or 1.84(...) or 1.8(...)	Accept consistent use of a comma to indicate a decimal point
		A1	for 1.844(977205)	Answer must be given to at least 3 decimal places rounded or truncated
		B1	for 1.84 or ft from (a) provided answer to (a) has at least 3 dp	
13 (i)	21	M1	for $180 - 75 - 84$	
		A1	cao	Angle may be indicated on the diagram
		C1	for reason that <u>Angles</u> on a straight <u>line</u> add up to 180	The key words underlined must be present There should be no incorrect reasons given
14 (a)	15	B1	14 to 16	
		M1	for a complete method, eg $30 \times (36 \div 2)$ or $45 \times (36 \div 3)$ or $60 \times (36 \div 4)$ or ft "hourly rate from (a)" $\times 36$	May be seen using a complete build up method for "45" allow 44 to 46 ft for accuracy
		A1	for 540 or ft (a)	Condone use of mixed rates eg $75 \times 7 + 16 = 541$
15	$\frac{4}{9}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3}$	M1	converts into decimals or percentages or equivalent fractions, at least 2 conversions correct or for any 3 fractions in correct order	0.44(...), 0.6, 0.625, 0.66(...)
		A1	for $\frac{4}{9}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3}$	Accept in reverse order for this mark Accept expressed in equivalent decimals or percentages or fractions or in mixed numerical form

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
9 (a)	23	B1	cao	56 : 10 implies this mark only Accept 1 : 5.6
		M1	for 10 or 56 identified	
		A1	for 10 : 56 or any other equivalent ratio	
10	213	P1	for beginning to work with costs eg $1428 - 150 (= 1278)$ or $1428 \div 6 (= 238)$ and $150 \div 6 (= 25)$	
		P1	for complete process to find monthly payment eg "1278" $\div 6$ or "238" – "25"	
		A1	cao	
11	39 with reasoning	M1	for a method to find angle ACB eg $180 - 116 - 25$	$ACB = 39$ or $x = 39$ or $C = 39$ or just 39 is acceptable for this accuracy mark Angle may be shown on diagram if no ambiguity or contradiction The key words underlined must be present. There should be no incorrect reasons given. All reasons given should be used, not just a list of angle facts.
		A1	for 39	
		C1	for $x = 39$ with reasoning eg <u>Angles</u> in a <u>triangle</u> add up to 180 and <u>Vertically opposite angles</u> are equal or <u>Vertically opposite angles</u> are equal or <u>Angles</u> on a straight <u>line</u> add up to 180 OR The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u> and <u>Angles</u> on a straight <u>line</u> add up to 180	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
8 (a)	310	M1	for $360 - 50$	
		A1	cao	
	(b) Explanation	C1	for explanation relating to the type of angle 50° is, or an explanation why it is not an obtuse angle Acceptable examples It's (50°) an acute angle an angle below 90 is acute because it (50°) is less than 90 It (50°) is too small to be an obtuse angle an obtuse angle is greater than 90 (but less than 180) an obtuse angle is greater than 50 Not acceptable examples because 50° is not an obtuse angle an angle of 50° is a reflex angle an obtuse angle is all angles greater than 90 an obtuse angle is an angle greater than 120 an obtuse angle <u>is</u> 90 or more	

Do not accept contradictions in the answer, eg. "an obtuse angle is greater than 180 so 50 is an acute angle" **or** "an obtuse angle is greater than 90 and less than 270 "



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	6200	B1	for 6200 (accept in words)	
2	$\frac{7}{10}$	B1	or any equivalent fraction	
3	900	B1	cao	
4	12t	B1	for 12t	
5	100	B1	cao	
6 (a)	Cross marked at 0	B1		Allow if intention is clear
(b)	Cross marked at $\frac{1}{2}$	B1		Allow if intention is clear
7 (a)	9.3	B1	accept answer in the range 9.1 to 9.5	
(b)	106	B1	accept answer in the range 104 to 108	
(c)	isosceles	B1	for isosceles	Condone incorrect spelling provided intention is clear
8	96	P1	for process to find total distance before or after using scale, eg $8 + 16 (= 24)$ or “32” + “64” oe	Condone incorrect use of scale if addition seen.
		P1	for process to use scale, eg $8 \times 4 (= 32)$ or $16 \times 4 (= 64)$ or $[PR] \times 4$	where [PR] is 12 or 13 or is clearly stated
		A1	cao	



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
8 (i)	50	M1	for $360 - 220 - 90$ oe	
		A1	cao	
		C1	for <u>angles</u> at a <u>point</u> add up to 360	
(ii)	Reason	C1	for <u>angles</u> at a <u>point</u> add up to 360	Underlined words need to be shown
			Acceptable examples - A <u>full turn</u> adds up to 360 <u>Full rotation</u> is 360	
			Not acceptable examples - Angles in a circle add to 360 - A whole circle adds up to 360 - It must add up to 360 degrees $220 + 90 = 310$, $360 - 310$ - Angles at a point add up to 180 - Angles on a straight line add to 180	
			Note: If line <i>AO</i> or <i>OC</i> or <i>BO</i> is extended and used to find <i>x</i> in (i) then allow C1 for <u>angles</u> on a straight <u>line</u> add to 180	



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	-3 -1 2 4 7	B1	for -3 -1 2 4 7	Allow correct reverse order: 7 4 2 -1 -3
2	5	B1	cao	
3	0.31	B1	cao	Accept .31
4	35	B1	cao	
5	2	B1	cao	
6	(a) 10	B1	cao	eg 11 quarter squares drawn separately 3 quarters may be seen as one half square and one quarter square February and March totals may be seen on the diagram May be implied by 42 [Jan + Feb + Mar] is clearly their houses sold in Jan, Feb and March for this mark only $4\frac{1}{2}$ squares drawn for May gets P2 18 must be seen for full marks
	(b) 2 full squares and 3 quarters of a square	B1	for a diagram for April showing the equivalent of 2 full squares and 3 quarters of a square	
	(c) 18	P1	for process to find houses sold in February = $4 + 4 + 1 (= 9)$ or March = $4 + 4 + 4 (= 12)$ or $60 - ((\text{Jan} + \text{Feb} + \text{Mar}) + 11)$	
		P1	for a complete process, eg. $60 - ((\text{answer to part (a)}) + "9" + "12" + 11)$ or $60 - (2\frac{1}{2} + 2\frac{1}{4} + 3) \times 4 - 11$	
		A1	cao	
7	(a) 8.7	B1	for answer in the range 8.5 to 8.9	Allow free hand drawing
	(b) 67	B1	for answer in the range 65 to 69	
	(c) 6-sided shape	B1	for a 6-sided shape	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	0.25	B1	cao	
2	20	B1	cao	
3	150	B1	cao	
4	27	B1	cao	
5	645	B1	cao	
6	20	P1 P1 A1	for $30 + 45 \times 10 (= 480)$ or $50 \times 10 - 45 \times 10 (= 50)$ or $50 \times 10 - 30 (= 470)$ for $50 \times 10 - "480"$ cao SCB1 for answer 250 or -250 if P0 scored.	P1P1 for $500 - 450 - 30$ may be seen in stages
7	(a) 9.5 (b) acute (c) 32	B1 C1 B1	for answer in the range 9.3 to 9.7 for acute for answer in the range 30 to 34	Accept answer on the diagram Accept interior angle Do not accept co-interior angle Accept answer on the diagram
8	(a) (3, 1) (b) B at (3, -4) (c) (0, 2)	B1 B1 B1	cao cao cao	Accept a cross without label as long as unambiguous. Accept letter B or dot in place of cross.

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
8 (b)	9	M1	for beginning to work with range, eg $14 - 5$ or $5 - 14$ or 5 to 14 or an answer of -9	Condone eg $5, 14$ but not $5 + 14$
		A1	cao	
9 (i)	65	M1	for a complete method eg $180 - 85 - 30$ or $360 - 180 - 85 - 30$	May be seen on the diagram $85 + 30 + 65 = 180$ scores M1A0 unless 65 clearly identified
(ii)	Reason	A1	cao	
		C1	for <u>Angles</u> on a straight <u>line</u> add up to 180 or <u>Angles</u> at a <u>point</u> add up to 360	Reason must be for their chosen method If M0 awarded in (i) answer must be in the range 35 to 95 to award C1 Underlined words must be seen Condone use of $\angle$ s for angles
10	1 : 4	M1	for $20 : 80$ oe ratio or $4 : 1$	eg $10 : 40, 5 : 20, 2 : 8, 20\% : 80\%$ or $0.2 : 0.8$ oe
		A1	1 : 4	Condone $1\% : 4\%$ but not $0.01 : 0.04$ Accept $0.25 : 1$ or $\frac{1}{4} : 1$



Paper 1MA1: 1F				
Question	Working	Answer	Mark	Notes
25	CB extended to form CG	Reasoning	B1	for 35 or 75 or 145 or 105 or $DEF = 70$, marked on the diagram or 3 letter description
			M1	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 $FBC = 35$
			C2	(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
			(C1	(dep on B1 or M1) for one reason clearly used and stated.) <u>Corresponding</u> angles are equal, <u>alternate</u> angles are equal, <u>opposite angles</u> in a <u>parallelogram</u> are equal, <u>angles</u> in a <u>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</u> angles are equal, <u>angles</u> in a <u>quadrilateral</u> sum to 360, <u>co-interior</u> angles sum to 180, <u>allied</u> angles sum to 180, <u>angles</u> around a <u>point</u> sum to 360



Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
6		Correct pictogram with key	C3 [C2 [C1]	for a fully correct pictogram, including key for 2 circles drawn for Friday or $3\frac{3}{4}$ circles (or equivalent) drawn for Saturday] for deducing that one circle represents 4 cycles (or $20 \div 5$) or $\frac{1}{2}$ circle represents 2 cycles or $\frac{1}{4}$ circle represents 1 cycle]
7		shown	M1 M1 C2 [C1 OR M1 M1 C2	for (angle BCA) = $180 - 117 (= 63)$ for (angle CAB) = $180 - "63" - 54 (= 63)$ or (angle CAB) = $117 - 54 (= 63)$ for statement, eg. isosceles since angle BCA = angle CAB = 63 with fully correct reasons, from: <u>angles</u> on a <u>straight line</u> add up to 180° <u>angles</u> in a <u>triangle</u> add up to 180° <u>exterior angle</u> of a <u>triangle</u> is equal to sum of interior opposite angles for angle BCA = 63 and angle CAB = 63 and one of the above reasons] OR for $\frac{(180-54)}{2} (= 63)$ for identification of two angles in triangle ABC being "63" for statement, eg. isosceles since angle BCA = angle CAB = 63 and <u>angles</u> on a <u>straight line</u> add up to 180° and fully correct reasons: base angles of an <u>isosceles triangle</u> are equal and <u>angles</u> in a <u>triangle</u> add up to 180°



Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
			[C1]	for angle $BCA = 63$ and angle $CAB = 63$ and one reason from: base angles of an <u>isosceles triangle</u> are equal <u>angles</u> in a <u>triangle</u> add up to 180°]
8		30	M1 A1	for $12\text{ m} = 1.9$ to 2 cm or for a scale factor of 2.25 to 2.75 (comparing length of bus with height of the building) or a complete method using the height of the bus to compare with the height of the building. answer in range 27 to 33
9		2, 7 or 3, 13 or 5, 11 or 2, 23	M1 A1	for identifying two different prime numbers or two numbers which add up to give a square number or for a list of at least 3 prime numbers with no errors and a list of 3 square numbers with no errors. for two correct prime numbers
10		60	M1 A1	for method to find the number, eg. $48 \times \frac{3}{2} (=72)$ or to find $\frac{1}{6}$ th of the number, eg. $48 \div 4 (=12)$ cao



Paper: IMA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	10	B1	cao	May be shown on graph
		M1	for using the graph to take one correct reading	
		A1	30 or ft from correct use of graph	
13 (b)	4 : 1 : 2	M1	for start to express the statements as a ratio eg 4 : 1, 1 : 4, 1 : 2 or 2 : 1 with clear and correct link to Azmol, Ryan, Kim	Allow any equivalent ratio, integers only May be seen as part of an incorrect answer. May be seen as integer multiples of these algebraic expressions. Any letter may be used. Accept 8 : 2 : 4 or equivalent ratios involving integers
		A1	4 : 1 : 2 oe	
		(SCB1	3 integer numbers in correct ratio but no ratio notation, eg 4, 1, 2 or 20, 5, 10)	
14	shown	M1	for method to find angle ADC , eg $180 - 75 (= 105)$	Must be clear link to angle ADC , may be marked on diagram
		M1	for angle $BCD = 50$	
		M1	for method to find angle ABC , eg $360 - 100 - 50 = "105"$	Must be clear method/explanation shown. Angle marked on diagram is not sufficient. Underlined words need to be shown; reasons need to be linked to their method
		C1	(dep M3) for angles ADC , BCD and ABC correct and at least 2 appropriate reasons, eg vertically <u>opposite angles</u> are equal or <u>vertically opposite angles</u> are equal, <u>angles</u> on a straight <u>line</u> add to <u>180°</u> , <u>angles</u> in a <u>quadrilateral/kite</u> add up to <u>360°</u> ; <u>angles</u> at a <u>point</u> add up to <u>360°</u>	



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
22	60	M1	use of parallel lines to find an angle eg $ABE=70$ or $EBG=75$ or $EBC = 110$ or shows parts of x as 35 or 25	Parts of x should be identified on the diagram by the insertion of a dividing line through angle x (need not be identified or drawn parallel).
		M1	for a complete method to find angle x ; could be in working or on the diagram	Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		A1	for $x = 60$	
		C1	(dep on M1) for one reason linked to parallel lines and one other reason, supported by working taken from: <u>alternate</u> angles are equal, <u>allied</u> angles / <u>co-interior</u> angles add up to 180, <u>angles</u> on a straight <u>line</u> add up to 180, <u>angles</u> in a <u>triangle</u> add up to 180°	Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked do not credit. There should be no incorrect reasons given.



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
24	93	M1	for method to find angle ACB , eg $180 - 75 - 51 (= 54)$	Angles may be shown on diagram but must not be ambiguous eg. M0 for angle of 54° shown in the wrong place
		M1	(dep M1) for method to use the ratio, eg $"54" \div (2 + 1) (= 18)$	
		M1	for complete method, eg $180 - 51 - "18" \times 2$ or $75 + "18"$ oe	
		A1	cao	
25	No (supported)	P1	for process to find total weight of the 4 red bricks, eg. $5 \times 4 (= 20)$ or for process to find total weight of the 5 blue bricks, eg. $9 \times 5 (= 45)$	May be seen next to statements 20 must be clearly referenced to the red bricks. $5 + 9 + 6 = 20$ scores no marks Candidates working in grams will need to give 7100 and 7000 for example as comparable figures.
		P1	for process to find total weight of all 10 bricks, eg. $"20" + "45" + 6 (= 71)$	
		C1	No with correct supporting evidence Acceptable examples No, it is 7.1 She is wrong, it is 0.1 more No, (the total weight is) 71 not 70 Not acceptable examples Yes No, it is 71	

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
16	243	M1	for $1.8 \div 100 \times 4500$ oe (= 81) or for a complete method eg $4500 \times 1.8 \times 3 \div 100$ oe or for 4743 or 4257	Award M1 for 4500×1.018^n
		A1	cao	
17	26	M1	for $ADB = 64$ or $ABD = 52$	May be shown on the diagram Correct method can be implied from angles on the diagram if no ambiguity or contradiction. Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.
		M1	for complete method, eg $(180 - 64 - 64) \div 2$ oe	
		A1	for 26	
		C1	(dep on first M1) for two correct reasons appropriate to their method from base <u>angles</u> of <u>isosceles triangle</u> are equal sum of <u>angles</u> in a <u>triangle</u> = 180 sum of <u>angles</u> on a straight <u>line</u> = 180 the <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior</u> <u>opposite angles</u>	
18	(a)	M1	for $2n$ or $n - 5$ or T = a linear expression in n	Allow variables other than n Each age must be an expression in n
		M1	for $n + 2n + n - 5$ oe OR for T = an expression in n with 2 of 3 ages correct eg $T = n + n^2 + n - 5$	
		A1	for $T = 4n - 5$ oe eg $T = n + 2n + n - 5$	
	(b)	B1	for $5m - 3m = 2m$ indicated	



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
23	144	P1	for using the ratio, eg $x = 2y$ or $2y + 2y + y (= 180)$ or $2 + 2 + 1 (= 5 \text{ (parts)})$	The first two marks may be awarded in either order Award P2 for $x = 72$ or $y = 36$
		P1	for using angle facts to give an equation, eg $x + x + y = 180$ or $2y + 2y + y = 180$ or $y + w = 180$ or $5x \div 2 = 180$ or $w = 2x$ or for $180 \div 5 (= 36)$	
		P1	for a complete process eg $180 - (180 \div 5)$	
		A1	cao	
24	2400	P1	for setting up an equation in x eg $x + (3x + 1) + (2x - 5) = 44$ or $6x - 4 = 44$ or $x = 48 \div 6 (= 8)$	
		P1	for substituting "8" into either $(3x + 1)$ or $(2x - 5)$ eg $3 \times "8" + 1 (= 25)$ or $2 \times "8" - 5 (= 11)$	
		P1	for finding the mass of one book eg $7500 \div "25" (= 300)$	
		P1	for finding the mass of the books on shelf A eg $"300" \times "8"$	
		A1	cao	
25	2.7	M1	for use of density = mass $\div$ volume eg $27 \div 10$	
		A1	oe	



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
17	16 0 2 8	B2	for a fully correct ordered diagram	Accept stem of 160, 170, 180, 190
	17 2 2 3 7 8	(B1)	for a complete unordered diagram or for an ordered diagram with at most one error or omission)	Can be in reverse vertical order (with matching leaves) eg 19, 18, 17, 16
	18 0 0 3 4 6 8			Errors can be omissions; one number in the wrong position is one error.
	19 1 7	B1	(indep) for correct key, eg 16 0 or 160 0 represents 160	Key must be consistent with the stem.
Key: 16 0 = 160 or 160 0 = 160				
18 (a)	1.882(0861678...)	B2	1.882(0861678...)	Condone 1.882(0861668...) for both marks
		(B1)	for 16.6 or 8.82 or $\frac{830}{441}$ or 1.88)	
(b)	1.88	B1	for 1.88 or ft their answer to part (a) correctly rounded to 2 dp, providing part (a) has at least 3 dp	Condone 1.88 Do not accept trailing 0, eg 1.880
19	78	M1	for finding one angle within the triangle is $180 \div 3 (= 60)$	Angles must be clearly labelled on the diagram or otherwise identified.
		M1	for method to use parallel lines, eg $BDE = DBC$ or $BCD + CDE = 180$	Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		C2	(dep M2) for $(x =) 78$ with a correct reason relating to parallel lines and one other correct reason given, with no unused reasons.	If x is clearly identified as 78 award M2 (implied)
		(C1)	(dep M1) for one correct reason given for their chosen method, angles in an <u>equilateral triangle</u> are equal <u>alternate angles</u> are equal <u>angles</u> in a <u>quadrilateral</u> add up to 360 <u>angles</u> in a <u>triangle</u> add up to 180 <u>Allied angles</u> / <u>Co-interior angles</u> add up to 180	Underlined words need to be shown; reasons need to be linked to their method, which can be implied from correctly identified angles (stated or written on the diagram).

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
26	Shown with reason given	M1	for deriving a suitable equation, eg $4x + 15 + 2x + 15 + 4x + 8 + 3x - 3 = 360$ or $13x + 35 = 360$ or $4x + 15 + 2x + 15 = 180$ or $6x + 30 = 180$ or $4x + 8 + 3x - 3 = 180$ or $7x + 5 = 180$	May be seen in an equation If starting with an equation = 180 need to substitute into the opposite pair.
		M1	(dep) for a method to isolate terms in x , eg $4x + 2x + 4x + 3x = 360 - 15 - 15 - 8 + 3$ or $4x + 2x = 180 - 15 - 15$ or $4x + 3x = 180 - 8 + 3$	
		A1	for solving equation to $x = 25$	
		C1	for substituting $x = 25$ into $A + B$ or $C + D$ and showing = 180, and gives a suitable statement, eg co-interior/allied angles (sum to 180), or since $A + B = 180$ the lines are parallel	
	Shown	Alternative solution assuming it is a trapezium		
		M1	for deriving a suitable equation, eg $4x + 15 + 2x + 15 = 4x + 8 + 3x - 3$ or $6x + 30 = 7x + 5$	
		M1	(dep) for a method to isolate terms in x , eg $15 + 15 - 8 + 3 = 4x + 3x - 4x - 2x$	
		A1	for solving equation to $x = 25$	
		C1	for a fully correct statement, eg since $A + B = 180$ the lines are parallel	
		27	2	
A1	cao			



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
13	Shown	M1	for a method leading to the evaluation of another angle, ($BAC =$) $360 - 310 (= 50)$ or ($ACB =$) $180 - 115 (= 65)$	Angles may be seen on diagram
		M1	for a method to find at least 2 angles, eg ($BAC =$) $360 - 310 (= 50)$ and ($ACB =$) $180 - 115 (= 65)$	
		C2	(dep M2) $CBA = 65^\circ$ and statement and appropriate angle reasons, eg statement $ACB = CBA (= 65^\circ)$ or two angles are equal (so it is isosceles) and <u>angles</u> at a <u>point</u> add up to 360, <u>angles</u> on a straight <u>line</u> add up to 180, <u>angles</u> in a <u>triangle</u> add up to 180, OR (dep M2) $CBA = 65^\circ$ and statement and appropriate angle reasons, eg statement $ACB = CBA (= 65^\circ)$ or two angles are equal (so it is isosceles) and the <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u> and <u>angles</u> on a straight <u>line</u> add up to 180 or <u>angles</u> in a <u>triangle</u> add up to 180	
		(C1)	(dep on M1) for any one appropriate reason related to method shown)	
14 (a)	2	B1	cao	Accept hand drawn, ruler not required but intention clear
		M1	for straight line from (3, 5) to (5, 5) or for a straight line from (5, 5) to (630, 0) or line drawn from (3, 5) to (430, 0) or a line drawn from (x, 5) to (x + 130, 0) where $x \geq 3$	
		A1	cao	
(b)	Graph completed			

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
16	Shown	C1	for angle $ECD = 70$ or for angle $ADB = 70$ and angle $DAB = 40$ for a correct relevant reason relating to finding an angle in a triangle, eg	May be seen on the diagram Do not award if an incorrect statement about angles in triangles seen.
		C1	- base angles of an isosceles triangle are equal - sum of angles in a triangle is 180	
		C1	for comparison of angles which would show that EC is parallel to AB , eg - angle $ECD = \text{angle } ABC (= 70)$ - angle $BAD = \text{angle } CED (= 40)$ - angle $BCX = \text{angle } ABC (= 70)$ - angle $AEY = \text{angle } BAD (= 40)$ - angle $ECB = 110$ and angle $ECB + \text{angle } CBA = 180$ - angle $AEC = 140$ and angle $BAD + \text{angle } AEC = 180$ - angle $ECD = \text{angle } ABD (= 70)$ and angle $DAB = \text{angle } DEC (= 40)$	Allow alternative correct labelling of angles eg angle ABD for angle ABC Must be identified in some way, not just angles written on diagram. Angles must be unambiguously identified. Where X is a point on EC extended. Where Y is a point on CE extended.
		C1	for a correct reason relating to angles in parallel lines which would show that EC is parallel to AB , eg - corresponding angles are equal with angle $ECD = \text{angle } ABC (= 70)$ - corresponding angles are equal with angle $BAD = \text{angle } CED (= 40)$ - alternate angles are equal with angle $BCX = \text{angle } ABC (= 70)$ - alternate angles are equal with angle $AEY = \text{angle } BAD (= 40)$ - co-interior angles add to 180 with angle $ECB + \text{angle } CBA = 180$ - co-interior angles add to 180 with angle $BAD + \text{angle } AEC = 180$ - similar triangles with angle $ECD = \text{angle } ABD (= 70)$ and angle $DAB = \text{angle } DEC (= 40)$	Reason must be consistent with their method. If superfluous reasons seen then we need the correct appropriate reason to be linked to the comparison of angles. Incorrect statement(s) seen is maximum 3 marks. Accept allied for co-interior.



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
13	105	M1	for a method to find an unknown angle, eg angle $BCD = 120$ or angle $BCD = 360 - 120 - 2 \times (180 - 120) (= 120)$ or angle $BCE = 180 - 120 (= 60)$ or angle $DCF = 180 - 120 (= 60)$	Angles may be seen on diagram. Angles must be clearly labelled on the diagram or otherwise identified.
		M1	for a complete method to find the value of x , eg $(x =) 360 - "120" - 45 - 90 (= 105)$	
		C2	for 105 as the answer and full reasons for their method, eg vertically <u>opposite angles</u> are equal OR <u>vertically opposite angles</u> are equal <u>angles</u> in a <u>quadrilateral</u> add up to 360 or <u>angles</u> on a straight <u>line</u> add up to 180 <u>angles</u> at a <u>point</u> add up to 360 <u>angles</u> in a <u>quadrilateral</u> add up to 360 or <u>angles</u> on a straight <u>line</u> add up to 180 <u>angles</u> in a <u>quadrilateral</u> add up to 360	Underlined words need to be shown; reasons need to be linked to their method; if student gives any reasons not linked to their method, award maximum C1 only Accept " $\angle$ s" for "angles" Accept "4-sided shape" for "quadrilateral"
		(C1)	(dep M1) for one correct reason)	For C1, ignore any reasons not linked to their method
14 (a)	115	B1	for answer in the range 113 to 117	
(b)	30	M1	for length of CD measured in the range 7.3 to 7.7 or for $4 \times [\text{length}]$	[length] is their measurement clearly identified as CD
		A1	for answer in the range 29.2 to 30.8	



Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
13		92, 65, 23	P1 P1 P1 A1	for two of x , $4x$ and $4x - 27$ (where x is the smallest angle) (dep) for equation summing their three angles to 180, eg $x + 4x + 4x - 27 = 180$ (dep P1) for correct process to simplify their algebraic expression, eg $9x - 27 (=180)$ P1 for correct process to solve their equation of the form $ax + b = 180$ for three correct angles (order irrelevant)
14 (a)	\$ £ 5 2.631... 60 31.578... 196 103.157... 2744 1444.21... 2804 1475.789...	2975.79	P1 P1 P1 P1 A1	for process to find total room cost eg $196 \times 14 (= 2744)$ for process to find total wifi cost eg $5 \times 12 (= 60)$ for using exchange rate appropriately (could be used earlier in the question), eg " $2804 \div 1.90 (= (£)1475.789...$) or $1500 \times 1.90 (= (\$)2850)$ " P1 for process to find the total cost in £, eg " $1475.79(\dots) + 1500$ " or in \$, eg " $2850 + 2804 (= 5654)$ " 2975 to 2976
(b)		Statement	C1	Statement about the total price rising May comment that flights will not change but the rest will rise



Paper: IMA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	40	M1	for using 90, eg $90 - 25 - 25$	90 – 25 is enough for this mark
		A1	cao	
	(b)(i) <i>b</i> or <i>d</i> with reason	B1	for <i>b</i> or <i>d</i> (or both)	A correct answer can be implied by writing 125 immediately next to <i>b</i> or <i>d</i> (or both) as long as 125 is not written next to an incorrect angle. Underlined words need to be shown; reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.
		C1	(dep) for appropriate reason(s) vertically opposite angles are equal vertically opposite angles are equal corresponding angles are equal alternate angles are equal angles on a straight line add up to 180	
(ii)	reason	C1	for correct explanation using 360 or a full explanation using angles around a point Acceptable examples Because 360 around a point $360 - 125 = 235$ $125 + 235 = 360$ Because they add to 360 Not acceptable examples Because <i>b</i> is 125	Using 360 appropriately and not in an incorrect setting
13	10x	B1	for 10x oe	



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
24	20	P1	for process to find SP of 24 chocolate bars, eg. $0.50 \times 24 (= 12)$ oe or for process to find the overall profit eg $(24 \times 0.5) - 10 (=2)$ or for process to find CP of one chocolate bar, eg. $1000 \div 24 (= 41.66\dots)$ oe	Working can be carried out in either pounds or pence.
		P1	(dep) for start to a process to find percentage profit, eg. using $\frac{12-10}{10}$ or $\frac{12}{10}$	
		A1	or $\frac{50-41.66\dots}{41.66\dots}$ oe with consistent units cao	
25	85 with working and reasons	M1	for correct use of corresponding angles eg $\angle EAB = 63$ or co-interior angles eg $BCD = 180 - 148 (= 32)$ or $DEB = 180 - 63 (= 117)$	Angles must be clearly labelled on the diagram or otherwise identified. Full solution must be seen. Correct method can be implied from angles on the diagram if no ambiguity or contradiction. When reasons are given the key words underlined must be present. Reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.
		M1	(dep) for a complete method to find angle EAB eg. $180 - "63" - (180 - 148)$ or $148 - "63"$ or $"117" - (180 - 148)$	
		A1	for $EAB = 85$ (identified)	
		C2	(dep on M2) all working correct with all appropriate reasons stated. <u>Corresponding</u> angles are equal <u>Allied</u> angles / <u>Co-interior</u> angles add up to 180 <u>Angles</u> on a straight line add up to 180 <u>Angles</u> in a triangle add up to 180 The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u> .	
		(C1	for one reason relating to parallel lines clearly used and stated or for any two reasons clearly stated for their fully correct method)	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
19	42	P1	for process to find number of red counters, eg. $400 \div 8 \times 3 (=150)$ or process to convert both to percentages: $3/8$ as 37.5 and $82/400$ as 20.5 or process to convert both to fractions with common denominator: eg $3/8$ as $75/200$ and $82/400$ as $41/200$ oe	NB could use other decimals eg 0.375, 0.205 or % or fractions
		P1	for process to find number of green counters, eg $400 - "150" - 82 (=168)$ or process to find the percentage of red and yellow counters eg $"37.5" + "20.5" (=58)$ or $("150" + 82) \div 400 \times 100 (=58)$	
		P1	for complete process to find the percentage of counters that are green, eg $"168" \div 400 \times 100$ or $100 - (37.5 + 20.5)$ or $100 - "58"$	
		A1	cao	
20	118 with reasons	M1	for angle $QPR = 56$ or $CQP = 56$	Angles must be clearly labelled on the diagram or otherwise identified. Full solution must be seen. Correct method can be implied from angles on the diagram if no ambiguity or contradiction. When reasons are given the key words underlined must be present. Reasons need to be linked to their method; any reasons not linked, do not credit. There should be no incorrect reasons given.
		M1	for angle $PQR = (180 - 56) \div 2 (=62)$	
		C1	(dep on a previous M1) for giving a reason relating to parallel lines: angle $CQR = 180 - "62"$ (<u>Allied angles</u> / <u>Co-interior angles</u> add up to 180) or angle $CQP = 56$ (<u>corresponding angles</u> are equal) or use "angle QPR " (<u>alternate angles</u> are equal)	
		C1	(dep on a previous M1) for at least one reason given from: vertically <u>opposite angles</u> are equal OR <u>vertically opposite angles</u> are equal or base angles of an <u>isosceles triangle</u> are equal or <u>Angles</u> in a <u>triangle</u> add up to 180	
		A1	for 118	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
22	Shown with reasons	M1	for method to find ACD using parallel lines eg $BCA = 125$ and $ACD = 180 - 125 (= 55)$ or $BCF = 180 - 125 (= 55) = ACD$ or $FCD = 125$ and $ACD = 180 - 125 (= 55)$ or $CFG = 180 - 125 (= 55) = ACD$	Angles must be clearly labelled on the diagram or otherwise identified. Correct method can be implied from angles on the diagram if no ambiguity or contradiction.
		M1	for method to find ADC eg $180 - 110 (= 70)$ or for method to find CAD eg $180 - ("70" + "55") (= 55)$ or $110 - "55" (= 55)$	
		A1	for $ACD = 55$ and $CAD = 55$	
		C1	for one correct parallel lines reason linked to their method eg <u>Corresponding</u> angles are equal <u>Allied</u> angles / <u>Co-interior</u> angles add up to 180 <u>Alternate</u> angles are equal	
		C1	for one other reason stated linked to their method eg <u>Angles</u> on a straight <u>line</u> add up to 180 <u>Angles</u> in a <u>triangle</u> add up to 180 <u>Vertically opposite angles</u> are equal OR <u>Vertically opposite</u> angles are equal The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u> . <u>Angles</u> in a <u>quadrilateral</u> add up to 360. Accept "4-sided shape"	
23	17.5	P1	for a first step, eg $5 \times 14 (= 70)$ or $14 \div 4 (= 3.5)$ or $5 \div 4 (= 1.25)$ or $4 \div 5 (= 0.8)$	Could be done algebraically. 11.2 as answer scores no marks.
		A1	oe	



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
20	1 : 3	M1	for method to find angle ABC , eg $180 - 2 \times 81 (= 18)$ oe	Award first 3 marks for angles 18, 72, 54 marked on diagram provided not ambiguous Accept $n = 3$ $1 : 3$ or $n = 3$ without working scores 0 marks
		M1	for method to find angle BCD , eg $"18" \times 4 (= 72)$	
		M1	for method to find angle CBD , eg $\frac{180 - "72"}{2} (= 54)$	
		M1	(dep M3) for writing as ratio, eg $"18" : "54"$ or for an answer of $1 : 3n$ or $3 : 1$	
		A1	(dep M3) for $1 : 3$ from correct working	
21	(a)	B1	for $3(2x - 5)$	
	(b)	B1	for $m(m + 5)$	
22	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 answer of 3 or 7 or 3×7 if M0 scored	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	18 000	B1	cao	
2	30	B1	cao	
3	reflex	B1	cao	
4	0.03, 0.1, 0.16, 0.2, 0.21	B1	for 0.03, 0.1, 0.16, 0.2, 0.21	accept 0.21, 0.2, 0.16, 0.1, 0.03
5	8	B1		Accept ± 8 or -8
6	1.5(0)	P1 P1 P1 A1	for $4 \times 1.30 (= 5.2(0))$ or $10 - 1.80 (= 8.2(0))$ for $10 - 1.80 - "5.20" (= 3)$ oe for $"3" \div 2$ cao SCB2 for answer (£)2.4(0)	Working could be in pence Condone answer £1.5(0)p

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	$\frac{17}{100}$	B1	for $\frac{17}{100}$ or any other equivalent fraction	
2	2 hours 20 minutes	B1	cao	
3	0.05, 0.5, 0.507, 0.57	B1	for 0.05, 0.5, 0.507, 0.57	Accept reverse order
4	hexagon	B1	cao	
5	3	B1	cao	
6	10	P1 P1 A1	for process to find greatest number of bracelets for one colour, eg $52 \div 5 (= 10(.4))$ or $80 \div 7 (= 11(.4..))$ for process to find greatest number of bracelets for both colours, eg $52 \div 5 (= 10(.4))$ and $80 \div 7 (= 11(.4..))$ cao	May be seen as a repeated addition or subtraction but must be complete for one colour, eg 50 or 70 May be implied by eg 50:70 or 50:77 Must see working with both colours for this mark.
7 (a)	12	M1 A1	for method to find mean, eg $(14 + 10 + 10 + 13 + 15 + 9 + 15 + 10) \div 8$ or $96 \div 8$ cao	Allow one error or omission but must divide by 8
(b)	6	M1 A1	for $15 - 9$ or $9 - 15$ or 9 to 15 cao	Condone eg 9, 15 but not $9 + 15$
(c)	cross at $\frac{1}{4}$	B1	for cross (or mark) at $\frac{1}{4}$	Accept any mark near to $\frac{1}{4}$ if the intention is clear; do not accept if additional marks are shown

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
7 (a)	D	B1	cao	This is awarded for a correct first step
	(b) B	B1	cao	
	(c) Shown	M1	for number of green counters, eg $12 - (3+1+2) = 6$ OR for $\frac{3}{12}$ oe $\frac{1}{12}$ oe $\frac{2}{12}$ oe linked to the appropriate colour	
		M1	for $1 - (\frac{3}{12} + \frac{1}{12}) (= \frac{8}{12})$ or $\frac{2}{12} + \frac{6}{12} (= \frac{8}{12})$ OR for method to find $\frac{2}{3}$ of 12, eg. $12 \div 3 \times 2 (= 8)$	This is awarded for a fully correct method from which the correct answer of $\frac{2}{3}$ can be found Sight of $\frac{8}{12}$ gets M2
		C1	for correct conclusion supported by accurate figures, eg $\frac{8}{12} = \frac{2}{3}$ OR $\frac{2}{3}$ of 12 = 8 and number of yellow + green = $2 + 6 = 8$	
8	36	M1	for method to find cost of 1 kg, eg $54 \div 3 (= 18)$ or $54 \div 3 \times 2$ oe	
		A1	cao	
9 (a)	Radius	B1	cao	Accept spelling mistakes
	(b) Tangent	B1	cao	Accept spelling mistakes



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
18 (a)	2	B1	cao	Check working space or next to the table. Zero points may not be seen so accept without $0 \times 4, 0$
(b)	81	M1	for working with values from the table eg $(0 \times 4), (1 \times 3), \dots$ with at least 3 products shown correct or $(0 +), 3, 14, 15, 24, 25$ with at least 3 correct	
		A1	cao SC B1 for 85	
19	$x = \frac{y-4}{2}$	M1	for correct first step to rearrange eg $y-4 = 2x + 4 - 4$ or $\frac{y}{2} = \frac{2x+4}{2}$ or ambiguously shown eg $x = y-4 \div 2$ or answer given as $\frac{y-4}{2}$	May be seen in different equivalent forms but must be carried out, not just intention seen. Could be shown as a flow diagram but must have correct inverse operations
		A1	oe	
20	105	M1	for evidence of understanding the angle properties of a square or equilateral triangle, eg stating angle $DBC = 60$ or angle $EBD = 45$ or angle $BAE = 90$	Accept on the diagram with no contradiction in working, or no contradiction or ambiguity on the diagram; 90 can be shown as a right angle Could be shown on the diagram or in working, but do not accept contradiction or ambiguity.
		A1	cao	
21	78	P1	for process to find the number of rand, eg $850 \times 18.53 (= 15750.5)$ OR for process to find number of £, eg $200 \div 18.53 (= 10.79 \dots)$	
		P1	(dep P1) for process to find the number of rand notes, eg “ $15750.5 \div 200 (= 78.7\dots)$ ” OR $850 \div “10.79\dots” (= 78.7\dots)$	
		A1	cao	

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
27	35.3	P1	for starting the process to find length of third side of triangle, eg $9^2 - 6^2 (=45)$ or $6^2 + x^2 = 9^2$	
		P1	for $\sqrt{9^2 - 6^2}$ or $\sqrt{81 - 36}$ or $\sqrt{45}$ or $3\sqrt{5}$ ($= 6.7..$) or $r^2 = 45$	
		P1	for stating or using $\pi \times [\text{radius}]^2 \div 4$	[radius] is any value
		A1	for answer in range 35.2 to 35.4	If an answer in the range 35.2 to 35.4 is given in the working space then incorrectly rounded, award full marks No working, answer only no marks
28	24	M1	for a complete method eg $360 \div 15 (=24)$	If extra steps are shown do not award this mark.
		A1	cao	
29	2	B1	cao	



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	30	B1	cao	
2	-10, -7, -2, 0, 1, 8	B1	Accept the reverse order, eg 8, 1, 0, -2, -7, -10	
3	0.09	B1	cao	Accept an answer of .09
4	330	B1	cao	
5	49	B1	cao	
6 (a)	Trapezium	B1	for trapezium	Accept incorrect spelling provided intention is clear Accept incorrect spelling provided intention is clear
(b)	Cylinder	B1	for cylinder	
7	14	M1 A1	for $42 \div 3$ cao	
8	Error identified	C1	error correctly identified Acceptable examples bar for brown is too high 16 should be 15 brown needs to be one less brown is wrong the graph does not match the table Not acceptable examples no title the gaps between the bars are wrong	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	$\frac{35}{100}$	B1	for $\frac{35}{100}$ oe	
2	7	B1	cao	
3	Two from 1, 2, 3, 4, 6, 12	B1	for any two correct factors from 1, 2, 3, 4, 6, 12	Do not allow any incorrect numbers
4	6m	B1	for 6m	
5	1.3	B1	cao	
6	drawing of a parallelogram	B2 (B1	for an accurate drawing of a parallelogram that is not a rectangle or a rhombus for a quadrilateral drawn with no lines of symmetry or for a quadrilateral drawn with rotational symmetry of order 2)	Accept freehand drawings with some inaccuracy if the intention is clear
7	29	P1 P1 A1	for a start to a process, eg. (total apples =) $86 + 75 + 92 (= 253)$ or (total oranges =) $68 + 80 + 76 (= 224)$ or differences each week, eg. (week 1) $86 - 68 (= 18)$ or (week 2) $75 - 80 (= -5)$ or (week 3) $92 - 76 (= 16)$ for complete process, eg “253” – “224” or “18” + “– 5” + “16”	
			cao	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
8	(a) 28 33	B1	cao	One correct, one incorrect statement gets C1 as long as they are not contradictory.
	(b) Explanation	C1	for explanation Acceptable examples all terms end in 3 or 8 there are no terms that end in 0 50 does not end in 3 or 8 48 and 53 are both in the sequence (could be shown) 48 is in the sequence and 50 is 2 more $5n-2=50$ so n is not a whole number. if it started at 0 then it would but it starts at 3 so it never will or shows sequence continuing up to and beyond 50 Not acceptable examples adding 5 each time will not lead to 50 (insufficient) it goes past 50 the closest number to 50 is 48	
9	(a) 5	B1	cao	
	(b) 9	B1	cao	
10	(a) cross at 0	B1	cao	To fit “5” the “5” needs to be clearly stated as being the number of even numbers; otherwise accept 5 only; could be indicated alongside the given numbers. Could be written as a decimal (0.62, 0.625 or 0.63) or equivalent percentages to these
	(b) cross at $\frac{1}{2}$	B1	cao	
	(c) $\frac{5}{8}$	M1	“5” for $\frac{5}{a}$ where $a > “5”$ or $\frac{b}{8}$ where $b < 8$ or for identifying all the even numbers, 2, 6 and 8 or for writing the correct probability using the wrong notation eg 5 : 8	
		A1	for $\frac{5}{8}$ oe	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	3107	B1	cao	
2	30	B1	cao	
3	4m	B1		
4	4	B1	cao	
5	-5, -2, 3, 7, 9	B1	cao	Accept in reverse order
6 (a)	14	B1	cao	
(b)	18	B1	cao	
7 (a)	evens	C1	oe	Accept 60% or an equivalent fraction eg $\frac{6}{10}$
(b)	certain	C1	oe	
(c)	0.6	B1	oe	
8 (a)	Square	C1	for statement of shape	Accept unambiguous misspellings.
(b)	Cuboid	C1	for statement of solid	Accept unambiguous misspellings. Accept square based prism

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	Two of: 1, 2, 3, 6, 9, 18	B1	for 2 correct factors and no incorrect	Allow more than 2 correct factors but no incorrect.
2	$\frac{9}{10}$	B1	oe	
3	700	B1	cao	
4	One of: 16, 25, 36, 49	B1	for one correct square number	Allow more than 1 correct square number but no incorrect.
5	120	B1	cao	
6	12.5(0)	M1 A1	for $50 \div 4$ cao	
7 (a)	Cone	B1	for cone or circular pyramid	
(b)	Diagram	B1	suitable diagram drawn	

Paper: 1MA1/1F					
Question	Answer	Mark	Mark scheme	Additional guidance	
7	(a)	Completed bar chart	B2	for a fully correct bar chart	Condone bars of unequal width Condone no gaps or inconsistent gaps
			(B1	for one bar correct, eg ‘50p’ plotted at 8 or ‘£1’ plotted at 3 or both reversed ie ‘50p’ plotted at 3 and ‘£1’ plotted at 8)	
	(b)	Shown	M1	for method to find total amount of at least two coin types, from $10(p) \times 12 (= 120(p))$, $20(p) \times 7 (= 140(p))$, $50(p) \times 8 (= 400(p))$, $(£)1 \times 3 (= 300(p) \text{ or } (£)3)$	Accept mixed units for both method marks e.g. $10p \times 12 (= 120)$, $20 \times 7 (= 1.4)$, $50(p) \times 8 (= 4)$, $1 \times 3 (= 300)$
			M1	for a complete method to find the total amount of money e.g. “120” + “140” + “400” + “300” (= 960) or “1.20” + “1.40” + “4” + “3” (= 9.60)	Accept mixed units for both method marks e.g. $120 + 140 + 4 + 3 (= 9.60)$
		C1	(dep on method shown for totals for at least two coin types or separate correct totals for at least two coin types) showing correct comparable figures eg (£)9.6(0) or 960(p) and 1000(p) or (£)0.4(0) or 40p	Answer must be in consistent units 9.60 oe alone with no working will score M1M1	
8	(a)	Completed kite	B1	cao	Condone unrulid lines.
	(b)	Cylinder	B1		Allow circular prism, do not allow prism or circle alone Condone poor spelling
9	(a)	$x - 5$	B1	cao	Allow $- 5 + x$
	(b)	$2x$	B1		Allow $x + x$ or $x2$ or $x \times 2$ or $2 \times x$
	(c)	3	B1	cao	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
28	24	P1	starts process, eg $x + 11x = 180$ or $180 \div 12 (= 15)$ or interior angle + exterior angle = 180 oe	
		P1	complete process to find number of sides, eg $360 \div (180 \div 12)$	
		A1	cao	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
27	132	M1	for finding an exterior angle eg $360 \div 6 (= 60)$ or $360 \div 5 (= 72)$ or an interior angle eg $180 \times 4 \div 6 (= 120)$ or $180 \times 3 \div 5 (= 108)$	Angles may be shown on the diagram Only award this mark for an angle that is not contradicted Answer only award no marks
		M1	for a complete method eg $360 - "120" - "108"$ or $"60" + "72"$	
		A1	cao	
28	(a)	B2	for all 4 values correct	Accept a freehand graph drawn that is not made of line segments Ignore anything drawn outside the required range ft their graph for this mark Accept these coordinates reversed
		(B1)	for 2 or 3 correct values)	
	(b)	B2	for a fully correct graph	
		(B1)	ft (dep on B1in (a)) for plotting at least 5 of the points from their table correctly)	
	(c)	M1	for a correct method, eg marking intercepts with x-axis or one correct solution or both solutions given as a coordinates, eg (0.4, 2.6) or (0.4, 0) and (2.6, 0)	
		A1	for answers in the range 0.3 to 0.5 and 2.5 to 2.7 or ft their graph with at least 2 solutions	

Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
1	1480	B1	cao	
2	$\frac{7}{10}$	B1	oe fraction	
3	3	B1	cao	
4	Suitable number eg 725	B1	for a suitable 3 digit number ending in 0 or 5	
5	40	B1	cao	
6	-11, -7, -2, 3, 8, 10	B1	for -11, -7, -2, 3, 8, 10	Accept reverse order
7	(a) Hexagon	B1	accept irregular hexagon	Accept unambiguous misspellings
	(b) AF	B1	cao Accept FA	
	(c) AB or EF	B1	AB or EF . Accept BA or FE or both	
8	(a) 3, 2	B1	cao	Allow reasonable hand-drawn attempts
	(b) Point at $(-4, 3)$	B1	cao	
	(c) Circle drawn, centre $(1, -1)$	B2 (B1	fully correct diagram circle drawn with radius 4 cm (any centre) or circle drawn using centre $(1, -1)$ $r \neq 4$ cm)	

Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
9	5	P1	for process to work in consistent units, eg $12 \times 1000 (= 12000)$ or $105 \div 1000 (= 0.105)$	May be seen in subsequent calculations
		P1	for process to work with portion size, eg $105 \times 3 (= 315)$ OR $12 \div [0.105] (= 114.285...)$	For [0.105] allow use of 0.105, 1.05 or 10.5
		P1	for process to work with weight of food per week or number of days, eg $"315" \times 7 (= 2205)$ or $"315" \times 5 (= 1575)$ or $"315" \times 6 (= 1890)$ [12000] $\div$ "315" (=38(.095...)) OR $[114.285...] \div 3 (= 38(.095...))$ or $[114.285...] \div 7 (= 16.3...)$	For [12000] accept use of 12000, 1200 or 120 For [114.285] allow continued use of incorrectly converted figure from previous mark.
		P1	(dep P2) for process to find number of weeks, eg $"12000" \div "2205" (= 5.4...)$ OR $"38.095..." \div 7 (= 5.4...)$ OR $"16.3..." \div 3 (= 5.4...)$ OR $"2205" \times 5 (= 11025)$ or $"2205" \times 6 (= 13230)$ OR 975 or -1230	
		A1	cao	If a correct answer is given without supportive working award 0 marks.
10 (a)	Pentagon	B1	cao	
(b)	112.5	P1	for process to find total length using their edges eg 15×7.5 or [edges] $\times 7.5$	[edges] must be unambiguously identified
		A1	for 112.5 oe	
11	$\frac{7}{25}$	M1	for $\frac{n}{2+16+7}$ where n is an integer < 25	
		A1	cao	



Paper: 1MA1/3F				
Question	Working	Answer	Mark	Notes
18		68	P1 for a process to find the number of vanilla cakes, eg $420 \times 2 \div 7$ oe (= 120) P1 for a process to find the number of banana cakes, eg 420×0.35 oe (= 147) P1 (dep P1) for a full process to find the number of lemon/chocolate cakes eg $420 - (\text{vanilla cakes}) - (\text{banana cakes})$ (= 153) P1 (dep on previous P1) for a process to find the number of lemon cakes eg "$153 \div 9 \times 4$" oe (= 68) A1 cao OR P1 for writing two proportions in the same format P1 for combining the proportions of vanilla and banana cakes eg $2/7 + 7/20$ (= $89/140$) P1 (dep P1) for a full process to find the proportion or number of lemon/chocolate cakes eg $1 - "89/140"$ (= $51/140$) P1 (dep on previous P1) for a process to find the number of lemon cakes eg "$51/140 \times 420 \div 9 \times 4$" (= 68) A1 cao	
19		Shows polygon is a hexagon	M1 for a complete method to find the interior or exterior angle of the dodecagon eg $180 - \frac{360}{12}, \frac{180}{12} (12 - 2)$ oe (= 150), $360 \div 12$ (=30) M1 for a complete method to find the interior angle of polygon P eg at B or C: $360 - "150" - 90$ (= 120) or "$30" + 90$ (= 120) or for a complete method to find the interior or exterior angle of the hexagon eg $180 - \frac{360}{6}, \frac{180}{6} (6 - 2)$ oe (= 120), $360 \div 6$ (= 60) A1 for 30 and 120 or 30 and 60 or 120 and 150 or 60 and 150 C1 complete solution, fully supported by accurate figures	



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
28	162 supported	M1	for method to find sum of the interior angles of a hexagon eg $(6 - 2) \times 180 (= 720)$ oe OR for method to find sum of the interior angles of a pentagon, eg $(5 - 2) \times 180 (= 540)$ OR for method to find angle AFC or BCF , eg $(360 - 2 \times 117) \div 2 (= 63)$ OR for dropping a perpendicular from A or B to ED with 90° marked on ED and 27° at the top	Must be a complete process that would lead to a figure of 720 if evaluated correctly. For a pentagon there must be an indication that they have divided the hexagon into two halves. 63 may be shown on the diagram for angle AFC or angle BCF
		M1	for method to use ratio 2 : 1 eg marks as $2x$ and x or as x and $\frac{1}{2}x$ on diagram OR for $([\text{angle sum of hexagon}] - 2 \times 117) \div 6 (= 81)$ oe or $([\text{angle sum of hexagon}] \div 2 - 117) \div 3 (= 81)$ oe or $117 + 117 + 2x + 2x + x + x = [\text{angle sum of hexagon}]$ oe OR eg $([\text{angle sum of pentagon}] - 117 - 180) \div 3 (= 81)$ oe or $117 + 180 + 2x + x = [\text{angle sum of pentagon}]$ oe	Ratio must be used correctly if awarded for diagram Award provided $[\text{angle sum of hexagon}]$ is greater than 700 or $[\text{angle sum of pentagon}]$ is greater than 500 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified.
		M1	for finding angle $FED = 81$ or for finding angle $CDE = 81$ OR for complete process to find angle AFE eg $([\text{angle sum of hexagon}] - 2 \times 117) \div 6 \times 2$ oe OR $([\text{angle sum of pentagon}] - 117 - 180) \div 3 \times 2$ oe	This may be shown by solving a correct equation to find the value of x .
		C1	for accurate working leading to angle $AFE = 162$	Award marks for 162 on the diagram with working and not contradicted by the answer line. Award 0 marks for 162 without working.



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
29	45	P1	for $180 - 117 (=63)$ or states, or uses, exterior angle $+ x = 117$	Angles may be shown on the diagram. Any angle labelled correctly as 63 and not contradicted scores this mark
		P1	for process to find the exterior or the interior angle of the pentagon, eg $360 \div 5 (=72)$ or $180 - (360 \div 5) (=108)$ or $((5-2) \times 180) \div 5 (=108)$	Exterior = 108 or interior = 72 does not score the mark
		P1	for a complete process to find x, eg $180 - "72" - "63"$ or $"108" - "63"$ or $117 - "72"$	
		A1	cao	An answer of 45 with no supporting working scores 0
30	Result shown	M1	for finding the area of A or the area of B , eg $(\pi \times 15^2) \div 4 (=56.25\pi = 176.(7\dots))$ or $\pi \times 2.5^2 (=6.25\pi = 19.6(3\dots))$	May work without π or with an approximation of π Values may be rounded or truncated
		M1	for finding the area of A and the area of B , eg $(\pi \times 15^2) \div 4$ or $"6.25\pi" \times 9 (=56.25\pi = 176.(7\dots))$ or 177 AND $\pi \times 2.5^2$ or $"56.25\pi" \div 9 (=6.25\pi = 19.6(3\dots))$	
		C1	for conclusion eg, $\sqrt{56.25\pi \div 9 \div \pi} = 2.5$ oe or $\sqrt{\frac{6.25\pi \times 9 \times 4}{\pi}} = 15$ oe or $56.25\pi \div 9 = 19.6(3\dots)$ and $\pi \times 2.5^2 = 19.6(3\dots)$ oe or $6.25\pi \times 9 = 176.(7\dots)$ or 177 and $(\pi \times 15^2) \div 4 = 176.(7\dots)$ or 177 oe or for $((\pi \times 15^2) \div 4) \div (\pi \times 2.5^2) = 9$ oe	

Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
23	55	P1	for process to find the sum of the interior angles of a pentagon, eg. $180 \times (5 - 2) (= 540)$ oe	Can be implied by the shape correctly divided into triangle and quadrilateral or three triangles with correct angle sums marked.
		P1	for the start to a process of giving each angle in a common form, eg. $d = 3c$ or $e = 2c$ or $x, 3x, 2x$	Can be implied by division by 7 or 1, 1, 3, 2 given in a ratio eg 1 : 2 : 1: 3
		P1	for process to find the value of c , eg $([540] - 155) \div 7$ oe or for a correct equation in one variable, eg $c + 155 + c + 3c + 2c = [540]$ oe	Where [540] is what they believe to be the angle sum of the pentagon.
		A1	cao	
24	Rate of change of volume	C1	for a correct explanation Acceptable examples The rate of water poured Speed of pouring water out from the tank How fast the water is being used (in the tank over time) Amount of water decreasing in the tank each second Not acceptable examples Negative correlation / negative gradient Amount of water decreasing in the tank in seconds As time increases the volume of water in the tank decreases It is negative, the volume of litres is going down It represents the deceleration or changing speed	Allow amount of water increasing in the tank each second



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
23	1.037×10^4	M1 A1 A1	for 570 or 9800 or 0.57×10^3 or 98×10^2 for 10370 oe eg 10.37×10^3 or 103.7×10^2 for 1.037×10^4	
24	12	P1 P1 or P1 or A1	for (interior angle =) $(180 \div 3) + (360 \div 4)$ (= 150) for (exterior angle =) $180 - "150"$ (= 30) or for " 150 " = $\frac{(n-2) \times 180}{n}$ oe for $360 \div "30"$ or for a correct process to solve the equation as far as " 30 " $n = 360$ cao	150 may be seen on diagram. May be seen on diagram Exterior angle of 30 implies P1P1 A correct answer with no supportive working gets 0 marks Minimum supportive working is P1P1 or Trials of interior angle sum Finding $1800 \div 150 = 12$ oe with 12 as answer scores P1P1P1A1



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
26	140	P1	for complete process to find sum of the interior angles of a pentagon eg $(5 - 2) \times 180$ or exterior $360 \div 5 = 72$, interior $180 - 72 = 108$, 108×5 OR for complete process to find sum of the exterior angles of the pentagon eg $(180 - x) + (180 - 2x) + (180 - 125) + (180 - 115) + (180 - 90)$	Must be a complete process that could lead to a figure of 540 if that process is evaluated incorrectly
		A1	for sum of interior angles is 540 OR for sum of exterior angles is 360	360 must be identified as the sum of the exterior angles
		P1	for start to process to find angle <i>ABC</i> eg [angles in a pentagon] $- 115 - 125 - 90 (= 210)$ or $115 + 125 + 90 + x + 2x =$ [angles in a pentagon] OR $(180 - x) + (180 - 2x) + (180 - 125) + (180 - 115) + (180 - 90) = 360$	Award provided [angles in a pentagon] is greater than 400 Algebraic route needs to show both sides of the equation. LHS of equation may be simplified
		P1	for process to find angle <i>ABC</i> eg " $210 \div 3 (= 70)$ ", " 210 " divided in the ratio 2 : 1 or for process to find angle <i>BCD</i> eg $\frac{2}{3} \times "210"$ or for $3x = "210"$ or $-3x = -"210"$	Award if 70 is given for either <i>ABC</i> or <i>BCD</i> on the diagram
		A1	cao	Award marks for 140 on the diagram with working and not contradicted by the answer line. Award 0 marks for 140 without working.



Paper: 1MA1/3F				
Question	Answer	Mark	Mark scheme	Additional guidance
15	175	M1 A1	for a complete method eg $35 \times (4 + 1)$ oe cao	
16	Rotation of 90° , centre (0,0)	B2 (B1	Rotation of 90 about (0,0) or Rotation of 270, clockwise about centre (0,0) Rotation and 90 or Rotation and 270, clockwise or Rotation about (0,0))	Accept “origin” or “O” for (0,0)
17	Drawing	B1 B1	for drawing point <i>R</i> from <i>T</i> at a distance of 5.5 cm. for drawing point <i>R</i> from <i>T</i> on a bearing of 65°	Unless ambiguous point <i>R</i> can be indicated by a cross, dot, or interpreted as the end of a line drawn from <i>T</i> .
18	4	M1 M1 A1	for a correct first step eg shows $4 \times 2x - 4 \times 3$ or $8x - 12$ or $2x - 3 = \frac{20}{4}$ for isolating terms in <i>x</i> eg $2x = 5 + 3$ cao	



Paper: 1MA1/2F				
Question	Answer	Mark	Mark scheme	Additional guidance
26	21	P1	for process to work correctly with initial ratio, eg $120 \div 4 \times 9 (= 270)$ or $90 + 120 + 60 (= 270)$	Can be implied by $90 : 120 : 60$ or by a second ratio that totals to 270
		P1	for process to find the value of 1 part in the new ratio, eg $"270" \div (2 + 5 + 3) (= 27)$	
		P1	for process to find both values for Errol, eg $("27" \times 3) (= 81)$ and $(120 \div 4 \times 2) (= 60)$	
		A1	cao	
27	327	M1	for $147 + 180$ or for $360 - (180 - 147)$, or for drawing a suitable diagram with 147 in the correct position and with the bearing of A from B indicated	Diagram can be a sketch
		A1	cao	
28	65	P1	for a full process to find the volume of the container, eg $\pi \times 15^2 \times 43 (= 30\,394.9\dots)$	These steps may be completed in a different order Accept 9675π Accept 9.675π or $\frac{387}{40}\pi$ [volume] can be any value they believe to be the volume that might have been incorrectly converted (or not at all) If an answer is given in the range in working and then rounded incorrectly award full marks.
		P1	for a process to convert between cm^3 and litres, eg $"30\,394.9\dots" \div 1000 (= 30.39\dots)$ or [volume] $\div 1000$ or $0.47 \times 1000 (= 470)$	
		P1	for a complete process to find the time taken, eg [volume] $\div 0.47$ or [volume] $\div "470"$	
		A1	answer in the range 64.6 to 65	



Paper: 1MA1/2F				
Question	Working	Answer	Mark	Notes
7		No (supported)	B1 C1	for showing 11 or 13 or 17 or 19 with no non-prime numbers between 10 and 20, or for showing 23 or 29 with no non-prime numbers between 20 and 30. Ignore any numbers shown below 11. “No” supported by listing 11, 13, 17, 19 and 23, 29 and no non-prime
8 (a)		Statement	C1	States one thing wrong eg vertical scale is not linear oe
(b)		Trend described	C1	eg the trend is upwards, positive (trend) oe
9 (a)		2.75	M1 A1	for accurately measuring the distance between Backley and Cremford as 5.3 cm – 5.7 cm oe or their measurement $\times 0.5$ oe for answer in the range 2.65 to 2.85
(b)		130	B1	for answer in the range 128 to 132
10 (a)		12 cm ²	B1 B1	for numerical answer of 12 for units shown as cm ²
(b)		kite	B1	cao



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
12 (a)	11	B1	cao	+3 and ÷2 could be seen in a flow diagram Evidence could be provided by algebraic statement, numerical statements or by diagrams
	22	M1	Starts to find input using inverse operations, $41 + 3 (= 44)$ or sight of +3 and ÷2 or derivation of equation eg $2n - 3 = 41$	
		A1	cao	
13 (a)	025	B1	for angle in the range 23 to 27	Accept without the initial 0, eg. 25
	1.25	M1	for measurement of AB in the range 4.8 to 5.2 (cm) or 48 to 52 (mm)	Could be just seen on the diagram
		M1	for “5” $\times$ 25000 (= 125000) or “50” $\times$ 25000 (= 1250000) or “5” $\div$ 100000 (= 0.00005) or “50” $\div$ 1000000 (= 0.00005) or 25000 $\div$ 100000 (= 0.25) or 25000 $\div$ 1000000 (= 0.025)	125000 or 1250000 seen implies M1M1
		A1	for answer in the range 1.2 to 1.3	For the award of this mark, “5” or “50” can be any value in the range 4 to 6 or 40 to 60



Paper: 1MA1/1F				
Question	Answer	Mark	Mark scheme	Additional guidance
26 (a)	p^{10}	B1	cao	
	$2x^4y^2$	M1	for any two of $12 \div 6 (= 2)$, $x^7 \div 3 (= x^4)$, $y^3 \div 1 (= y^2)$ in a product or written as a fraction with complete and correct cancelling of at least two terms	
		A1	cao	
27 (i)	Distance in the range 20 to 23	P1	for a process to draw a bearing of 070° , eg. a line drawn 70° from the North line at P	Accept a line of any length as long as the intention is clear.
		P1	for a process to work out the distance PQ , eg. $12 \times 1.5 (= 18)$	
		P1	(dep previous P1) for the process to use the given scale eg. " 18 " $\div 4 (= 4.5$ cm)	
		A1	(dep P3) for distance in the range 20 to 23	
		A1	(dep P3) for bearing in the range 317 to 330	
27 (ii)	Bearing in the range 317 to 330			Award P3 for Q shown in the correct place on the diagram. 4.5 scores 2 marks provided there is a link to $12 \times 1.5 (= 18)$ Award no marks if no supportive processes Award no marks if no supportive processes Award A0A0 if Q is not in the correct place