OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS A

Foundation Paper 1

SPECIMEN

F **J512/1**

Time: 2 hours

Candidates answer on the question paper.
Additional materials: Geometrical instruments
Tracing paper (optional)

Candidate Name

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Show all your working. Marks may be given for working that shows you know how to solve the problem even if you get the answer wrong.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 100.

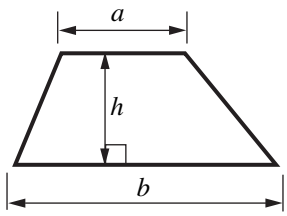
WARNING You are not allowed to use a calculator in this paper.

For Examiner's Use	
Total	

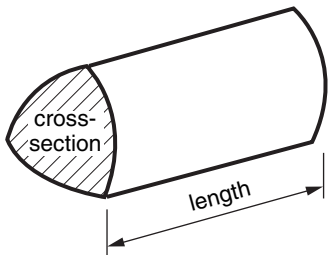
This document consists of **20** printed pages.

FORMULAE SHEET

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



Volume of prism = (area of cross-section) × length



1 Work out.

(a) 155 + 88

(a) .....[1]

(b) 592 – 148

(b) .....[1]

(c) 14 × 5

(c) .....[1]

(d) 162 ÷ 9

(d) .....[1]

(e) Estimate the answer to

$$96 \times 3{\cdot}1.$$

Show your calculation.

(e) ..... × ..... = ...[2]

2 **(a)** **(i)** Write down the next term in this sequence.

4 7 10 13 ☐ [1]

(ii) Describe the rule for continuing the sequence.

.....

.....[1]

(b) **(i)** Write down the next term in this sequence.

128	64	32	16	

[1]

(ii) Describe the rule for continuing the sequence.

.....

.....[1]

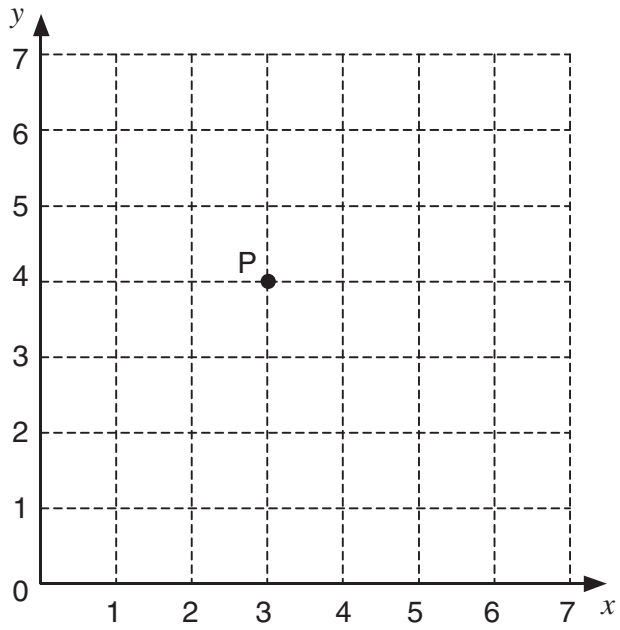
3 Rick is making fence panels.
Each fence panel needs 8 pieces of wood.
He has 60 pieces of wood.

How many fence panels can Rick make and how many pieces of wood will he have left over?

.....fence panels [2]

.....pieces left over [1]

4



(a) Write down the coordinates of point P.

(a) (..... , ...) [1]

(b) R is the point (5, 2).
On the grid, mark and label point R. [1]

(c) PQR is a right-angled triangle.
Write down the coordinates of two different possible positions for point Q.

(c) (..... , ...)

(..... , ...) [2]

5 **(a)** Complete the table below.

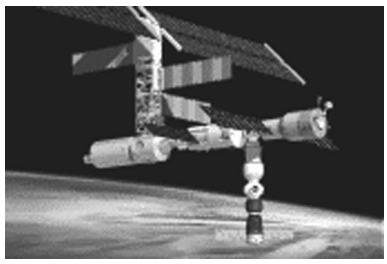
Fraction		Decimal		Percentage
$\frac{1}{2}$	=	0·5	=	.....
.....	=	.....	=	25%
.....	=	0·7	=	.....

[5]

(b) Work out 70% of 70.

(b) .....[2]

6 This is a picture of the International Space Station.



(a) The station weighs 186 880 kg.
Write 186 880 in words.

.....

.....[1]

(b) What is the place value of digit 6 in the number 186 880?

(b) .....[1]

(c) The station travels at a speed of seventeen thousand, one hundred and ninety miles per hour.

Write seventeen thousand, one hundred and ninety using figures.

(c) .....[1]

(d) Write your answer to part **(c)** correct to the nearest 100.

(d) .....[1]

(e) When a space shuttle takes off it burns 1000 gallons of fuel every second.

How many gallons would it burn in a minute at this rate?

(e) .....[2]

7 **(a)** Here are the instructions for cooking lamb.

Cooking time in minutes = Weight in kilograms × 50, then add 30.

(i) Callum wants to cook a piece of lamb that weighs 4 kilograms.

How many minutes should he cook it for?

(a)(i) ..... [2]

(ii) Sam cooked a piece of lamb for 130 minutes.

How much did it weigh?

(ii) .....kg [2]

(b) The cooking time for a piece of beef is 40 minutes for each kilogram, plus an extra 25 minutes.

Write an expression for the cooking time in minutes for a piece of beef that weighs w kilograms.

(b) .....[2]

8 Five pupils had a spelling test.
Here are the scores.

Name	Score
Lucy	8
Gurleen	7
Callum	8
Marcus	2
Will	3

(a) What is the mode of these five scores?

(a) .....[1]

(b) Two more pupils did the test the next day.
They both scored the same as Gurleen.

Work out the mean of **all seven** scores.

(b) .....[3]

(c) The probability that they will all pass next week's spelling test is 0·8.
What is the probability that they will not all pass next week's spelling test?

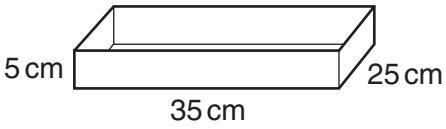
(c) .....[1]

9 **(a)**

This is the net of a 3-D shape.
What is the mathematical name of this 3-D shape?

(a) .....[1]

(b) This is a diagram of an open box.



It measures 35 cm by 25 cm by 5 cm.

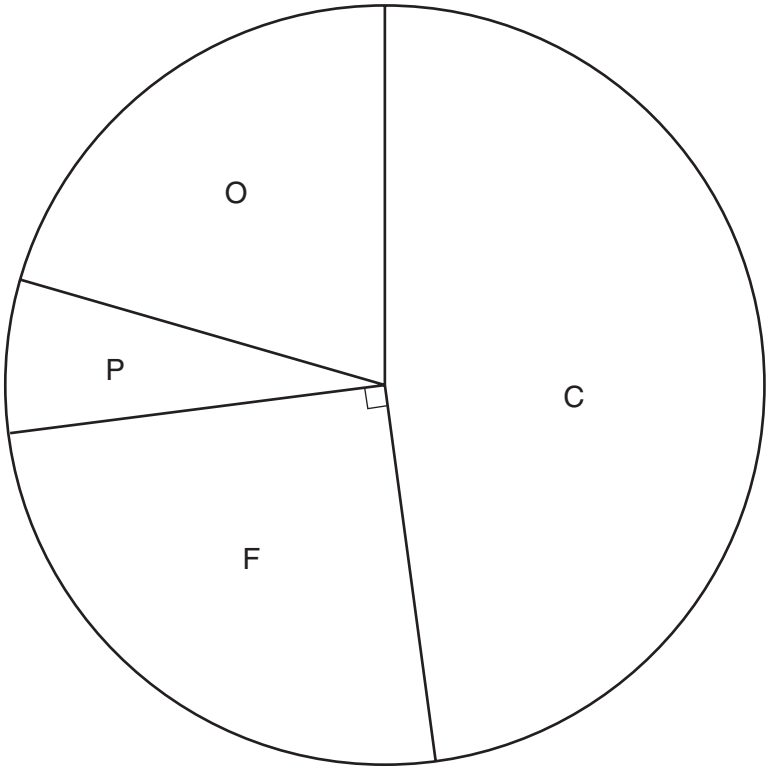
On the grid below draw a net of this open box.
Use a scale of 1 cm to 5 cm.

[4]

(c) Eddie wants to find the volume of this box in cubic centimetres.
Write down the calculation he needs to do.
You do **not** have to do the calculation.

(c) .....[1]

10 **(a)** This pie chart shows the nutritional information, by weight, for some crisps.



key	
C	Carbohydrate
F	Fat
P	Protein
O	Other

(i) Measure the angle for Carbohydrate.

(a)(i) ..... ° [1]

(ii) What fraction of these crisps is Carbohydrate?

(ii) ..... [1]

The weight of a bag of crisps is 28 g.

(iii) What is the weight of Fat in one bag?

(iii) .....g [2]

(b) The school tuck shop sells only 3 flavours of crisps:

Plain (P) **Chicken (C)** **Tomato (T)**

Olivia and Natasha each buy a bag of crisps.

List all the different combinations they could buy.
Two are done for you.
You may not need to use all the lines.

Olivia	Natasha
P	P
P	C

[2]

11 (a) Caroline's spinner shows different colours.
She spins it 400 times.
It comes up blue 80 times.

What is the probability her spinner comes up blue?

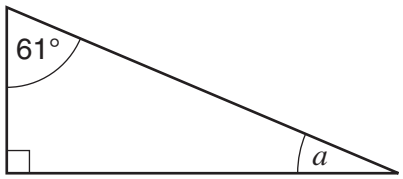
(a) ..... [1]

(b) How many times should she expect her spinner to come up blue if she spins it 1000 times?

(b)..... [2]

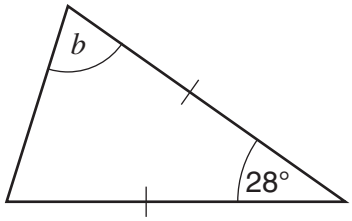
12 Work out the missing angles in these triangles.

(a) (i)



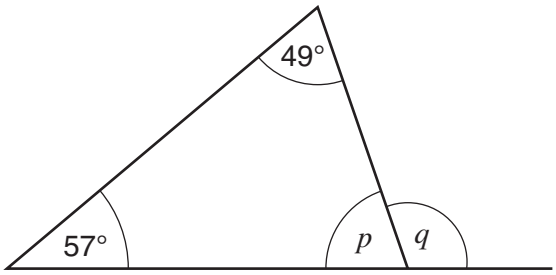
(a)(i) a = ... ° [2]

(ii)



(ii) b = ... ° [2]

(b) Work out angles p and q. Give reasons for your answers.



p = ...° because .....

.....[2]

q = ...° because .....

.....[2]

13 Solve.

(a) $10x - 11 = 4$

(a) .....[2]

(b) $\frac{x}{5} = 9$

(b) .....[1]

(c) $10 - x = 4$

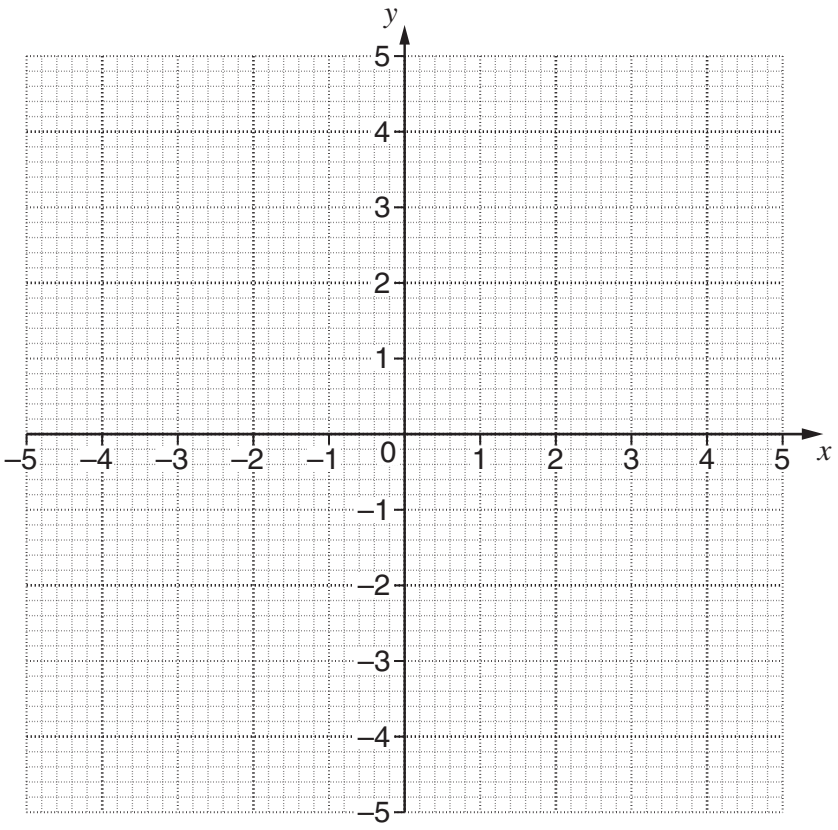
(c) .....[1]

14 **(a)** Complete the table for $y = 2x - 1$.

x	–2	–1	0	1	2	3
y	–5	–3	–1			

[1]

(b) Draw the graph of $y = 2x - 1$.

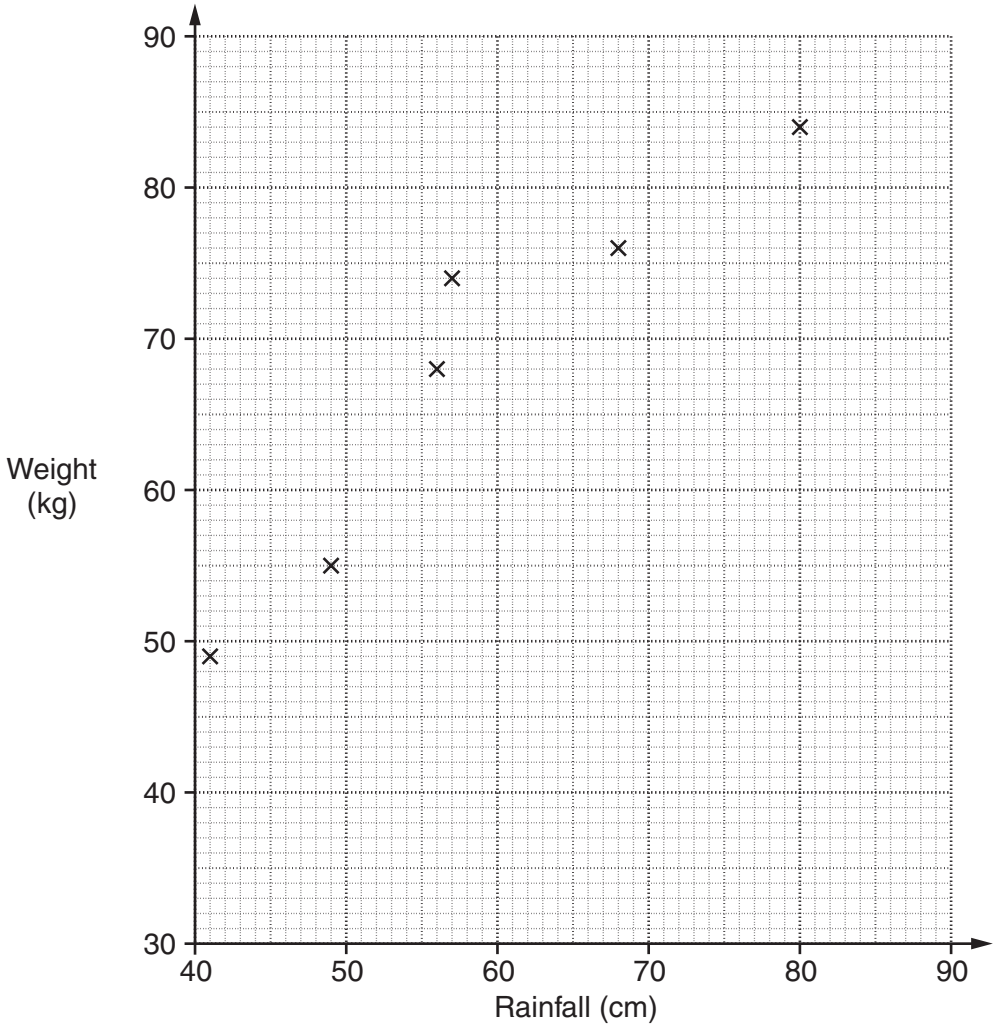


[2]

(c) Find the value of x where the line crosses the x-axis.

(c) .....[1]

15 A gardener records the rainfall in the growing season and the weight of apples that his trees produce each year. The scatter diagram shows his results for six years.



The information for two more years is given.

Rainfall (cm)	52	86
Weight of apples (kg)	60	88

(a) Add this information to the diagram. [1]

(b) Draw a line of best fit on the diagram. [1]

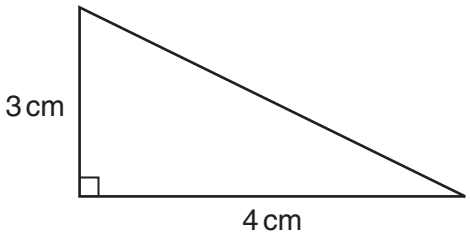
(c) **(i)** In another year, 64 cm of rain fell in the growing season.
Estimate the weight of apples produced that year.

(c)(i) .....kg [1]

(ii) Another year the trees produced 80 kg of apples.
Estimate the rainfall in that growing season.

(ii) .....cm [1]

16 **(a)** Calculate the area of this triangle.



NOT TO SCALE

(a) .....cm^2 [1]

(b) The triangle is the cross-section of a prism of length 10 cm.
Calculate the volume of the prism.
Give the units of your answer.

(b) .....[2]

17 Calculate.

(a) $7\frac{1}{2} - 2\frac{2}{3}$

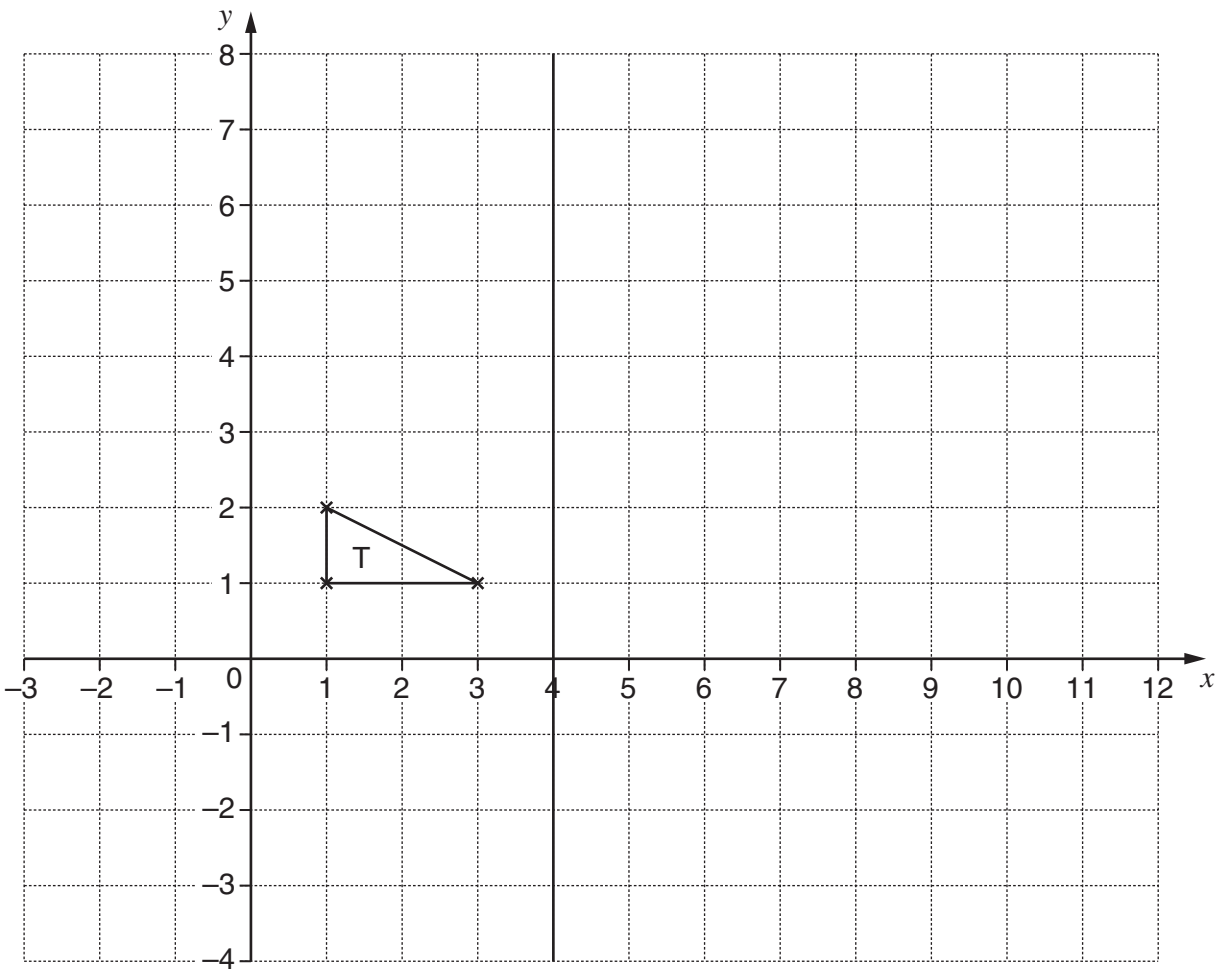
(a) .....[3]

(b) $\frac{2}{5} \div \frac{9}{10}$

Give your answer as a fraction in its lowest terms.

(b) .....[3]

18



(a) Enlarge triangle T by scale factor 3, centre the origin.
Label the image A. [3]

(b) Rotate triangle T through 90° anti-clockwise about the origin.
Label the image B. [3]

(c) Reflect triangle T in the line $x = 4$.
Label the image C. [1]

19 Solve.

(a) $2(x + 3) = 15$

(a) .....[3]

(b) $7x - 1 < 20$

(b) .....[2]

20

SALE
40% OFF EVERYTHING

The original price of a garden spade was £30.
What is the sale price of the spade?

.....[3]

1	**(a)**	243	**1**		
	(b)	444	**1**		
	(c)	70	**1**		
	(d)	18	**1**		
	(e)	100 x 3 or 100 x 3.1	**M1**		
		300 or 310	**A1**	**6**	
2	**(a)** **(i)**	16	**1**		
	(ii)	Add 3oe	**1**		Accept $n + 3$
	(b) **(i)**	8	**1**		
	(ii)	÷ 2 oe	**1**	**4**	Accept $n \div 2$
3		60 ÷ 8	**M1**		Repeated addition with 56 or 64 mentioned
		7	**A1**		
		4	**1**	**3**	
4	**(a)**	(3.4)	**1**		
	(b)	(5.2) correctly plotted	**1**		
	(c)	(3.2) and (5.4)	**1+1**	**4**	$(x, x - 3)$ or $(x, x + 1)$
5	**(a)**	50%	**1**		
		¼ oe 0.25	**1+1**		
		$^{7}/_{10}$ 70(%)	**1+1**		
	(b)	7 x 70	**M1**		**M1** for figs 49 seen
		49	**A1**	**7**	
6	**(a)**	One hundred and eighty six thousand, eight hundred and eighty	**1**		
		(6) Thousand			Accept 6 000
	(b)	17 190	**1**		
	(c)	17 200	**1**		
	(d)	60 000	**1**		Ft their **(c)**
	(e)		**M1**		
			A1	**6**	
7	**(a)**	4 x 50 (= 200) + 30 =	**M1**		
		230	**A1**		Condone 3 hrs 50 mins
	(b)	130 – 30 (= 100) ÷ 50	**M1**		
		2	**A1**		
	(c)	40w + 25, accept 40w kg + 25	**1+1**	**6**	Condone w40
8	**(a)**	8	**1**		
	(b)	(28) + 7 + 7	**M1**		
		their (42) ÷ 7	**M1**		
		6	**A1**		
	(c)	0.2 oe	**1**	**5**	

9 (a)	(Triangular Prism)	**1**		
(b)	One 5 x 7	**M1**		**SC3** for 1 dimension
	Two 5 x 1	**M1**		consistently incorrect
	Two 7 x 1	**M1**		Condone 4375
	Valid net depends on M3	**A1**		
(c)	35 x 25 x 5	**1**	**6**	
10 (a) (i)	172° ± 2°	**1**		
(ii)	Their 172/360 oe	**1**		
(iii)	¼ x 28	**M1**		
	7	**A1**		
(b)	PT, CP, CC, CT, TP, TC, TT	**2**		**B2** for all 7 (ignore repeats)
			6	No incorrect **B1** for 4 correct
11 (a)	80/400 oe	**B1**		
(b)	Their (a) x 1000	**M1**		
	200	**A1**	**3**	
12 (a)	90 – 61 oe	**M1**		
	29	**A1**		
(b)	(180 – 28) ÷ 2	**M1**		
	76	**A1**		
(c)	74	**1**		
	Angles in a triangle oe	**1**		
	106	**1**		Ft 180° – their 74°
	Angles on a straight line or exterior angle of a triangle	**1**	**8**	
13 (a)	$10x = 15$	**M1**		
	$1\dot{5}$	**A1**		
(b)	45	**1**		
(c)	6	**1**	**4**	Allow embedded answer in answer space
14 (a)	1, 3, 5	**1**		
(b)	At least 4 correct points plotted	**1**		
	Correct straight line drawn (to within half a square)	**1**		
(c)	$0\dot{5}$	**1**	**4**	Ft from their straight line
15	Points plotted	**B1**		± ½ mm
	Line of best fit with +ve gradient for $45< x <80$	**B1**		Ruled, no more than 2 crosses on 1 side than another
	ft graph	**B1**		± ½ mm
	ft graph	**B1**	**4**	± ½ mm

16 (a)	6	**B1**		
(b)	60 or (their 6) x $10cm^3$	**B1** **B1**	**3**	Ft
17 (a)	Deals with mixed numbers Uses common denominator $4\frac{5}{6}$ or $4\frac{5k}{6k}$ or **recurring** in answer space 4·83 or better earns **SC2**	**M1** **M1** **A1**		$7 - 2$ or 5 and $\frac{1}{2}-\frac{2}{3}$ or both correct top heavy for 1st **M1**
(b)	$\frac{2}{5}\times\frac{10}{9}$ multiplies or cancels $\frac{4}{9}$	**M1** **M1** **A1**	**6**	
18 (a)	Correct enlargement	**3**		for two vertices correct or any enlargement s.f. 3 or **SC1** for any enlargement centre O
(b)	Correct rotation	**3**		**B2** for correct 90° clockwise rotation or **B2B2** for two vertices correct or **SC1** for any 90° anticlockwise rotation with correct orientation or **B1** for one vertex correct
(c)	Correct reflection	**1**	**7**	
19 (a)	$2x + 6$ or $x + 3 = 7·5$ $2x = 15 -$ their 6 or $x = 7·5 - 3x$ $x = 4·5$	**B1** **M1** **A1**		Embedded answer in answer space earns 3
(b)	$(x) < 3$	**2**	**5**	**M1** for correct 1st step $7x < 21$, or division by 7
20	30 x ·4 oe 12 or 30 – *their* 30 x ·4 18	**M1** **M1** **A1**	**3**	Or U_n of ·6 **M1** 30 x ·6 **M1**

Paper Total: 100

Note: the marks for AO1 are subsumed within the marks for AO2-4

Question	AO2	AO3	AO4
1	6		
2	4		
3	3		
4		4	
5	7		
6	6		
7	6		
8			5
9		6	
10			6
11			3
12		8	
13	4		
14	4		
15			4
16		3	
17	6		
18		7	
19	5		
20	3		
Paper Total	**54**	**28**	**18**