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EDEXCEL INTERNATIONAL GCSE MATHS: QUESTIONS BY TOPIC

Measures, Accuracy & Estimation (N4)

International GCSE Mathematics A (4MA1) · Higher tier

34 questions · 111 marks · Mark schemes included

Past papers June 2018 - June 2025 · 3 sub-topics

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 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
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1. Q6	IGCSE Paper 2HR November 2020	2	4
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QUESTION	SOURCE	MARKS	PAGE
N4c UNITS, TIME & MONEY		1 Qs · 7 marks	38
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QUESTIONS

34 questions · 111 marks · 3 sub-topics

SUB-TOPIC N4a

ROUNDING & ESTIMATION

Sub-topic N4a · 1 question · 2 marks · lowest tariff first



- 6 Nav has worked out $\frac{68.3 \times 42.8}{0.021}$ on his calculator.

His answer is 139 201.9048

Without using a calculator and using suitable approximations, check that his answer is sensible.
Show your working clearly.

(Total for Question 6 is 2 marks)



SUB-TOPIC N4b

BOUNDS & ERROR INTERVALS

Sub-topic N4b · 32 questions · 102 marks · lowest tariff first



- (c) By drawing a suitable straight line on the grid,
find estimates for the solutions of the equation $x^3 - 2x^2 - x + 1 = 0$
Give your solutions correct to 1 decimal place.

.....
(4)

(Total for Question 14 is 8 marks)

- 15 $e = 8.31$ correct to 2 decimal places
 $f = 0.65$ correct to 2 decimal places

Work out the lower bound for the value of $e - f$
Show your working clearly.

.....
(Total for Question 15 is 2 marks)



- 4 Alexa has five cards.
Each card has a number on it.

The table gives information about the numbers on the five cards.

Total	Median	Mode	Range
45	8	5	10

Using the information in the table, complete each card by writing its number on it.

-------------	-------------	-------------	-------------	-------------

(Total for Question 4 is 3 marks)

- 5 The length of a book is 33.8 cm, correct to one decimal place.

(a) Write down the lower bound of the length of the book.

..... cm
(1)

(b) Write down the upper bound of the length of the book.

..... cm
(1)

(Total for Question 5 is 2 marks)



- 4 Each side of a regular octagon has a length of 18 mm, correct to the nearest 0.5 mm

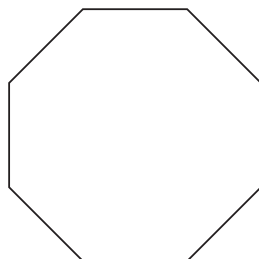


Diagram **NOT**
accurately drawn

- (a) Write down the lower bound of the length of each side of the octagon.

..... mm

(1)

- (b) Write down the upper bound of the length of each side of the octagon.

..... mm

(1)

(Total for Question 4 is 2 marks)

14 $T = \frac{p}{r}$

$p = 0.51$ correct to 2 significant figures.

$r = 6.3$ correct to 2 significant figures.

Work out the upper bound for the value of T
Show your working clearly.

(Total for Question 14 is 2 marks)



Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

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

(Total for Question 1 is 3 marks)

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

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

..... metres
(1)

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

..... metres
(1)

(Total for Question 2 is 2 marks)



2 The length of a ship is 142.8 m, correct to 1 decimal place.

(i) Write down the lower bound of the length of the ship.

..... m
(1)

(ii) Write down the upper bound of the length of the ship.

..... m
(1)

(Total for Question 2 is 2 marks)

3 Show that $2\frac{1}{4} \times 1\frac{5}{7} = 3\frac{6}{7}$

(Total for Question 3 is 3 marks)



19 $a = \frac{p - q}{t}$

$p = 8.4$ correct to 2 significant figures.

$q = 6.3$ correct to 2 significant figures.

$t = 0.27$ correct to 2 significant figures.

Work out the upper bound for the value of a .

Show your working clearly.

Give your answer correct to 1 decimal place.

(Total for Question 19 is 3 marks)



10 $A = 2^n \times 3 \times 5^m$

Write $8A$ as a product of powers of its prime factors.

(Total for Question 10 is 2 marks)

11 $C = b - a$

$a = 6$ correct to the nearest integer

$b = 15$ correct to the nearest 5

Work out the upper bound for the value of C
Show your working clearly.

(Total for Question 11 is 3 marks)



20

$$x = \frac{6a}{b - a}$$

$a = 3.46$ correct to 3 significant figures.

$b = 6.3$ correct to 1 decimal place.

Work out the upper bound for the value of x .

Give your answer as a decimal correct to 3 significant figures.

Show your working clearly.

.....
(Total for Question 20 is 3 marks)



16 $P = \frac{2a - c}{d}$

$a = 58.4$ correct to 3 significant figures.

$c = 20$ correct to 2 significant figures.

$d = 3.6$ correct to 2 significant figures.

Work out the upper bound for the value of P .

Show your working clearly.

Give your answer correct to 2 decimal places.

.....
(Total for Question 16 is 3 marks)



- 19 The diagram shows rectangle $ABCD$ with rectangle $EFGH$ cut out to form the shaded region.

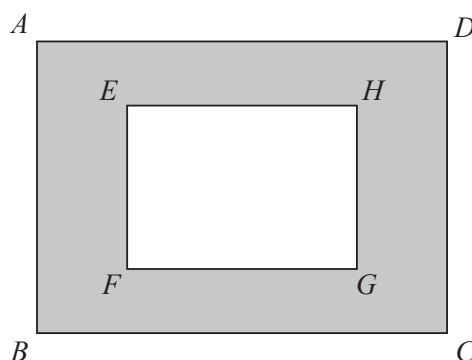


Diagram **NOT**
accurately drawn

$AD = 8.3$ cm correct to one decimal place

$DC = 7.2$ cm correct to one decimal place

$EH = 6.2$ cm correct to one decimal place

$HG = 5.3$ cm correct to one decimal place

Work out the upper bound of the area of the shaded region.

Show your working clearly.

..... cm²

(Total for Question 19 is 3 marks)



15

$$a = \frac{v - u}{t}$$

 $v = 9.6$ correct to 1 decimal place $u = 3.8$ correct to 1 decimal place $t = 1.84$ correct to 2 decimal placesCalculate the upper bound for the value of a .

Give your answer as a decimal correct to 2 decimal places.

Show your working clearly.

(Total for Question 15 is 3 marks)



19 $k = \frac{t}{a - h}$

$t = 14$ correct to 2 significant figures

$a = 7.8$ correct to 2 significant figures

$h = 3.4$ correct to 2 significant figures

Work out the lower bound for the value of k .
Show your working clearly.

(Total for Question 19 is 3 marks)



20 $P = \frac{t - w}{y}$

$t = 9.7$ correct to 1 decimal place

$w = 5.9$ correct to 1 decimal place

$y = 3$ correct to 1 significant figure

Calculate the upper bound for the value of P .
Show your working clearly.

(Total for Question 20 is 3 marks)



13 Here is a triangle XYZ .

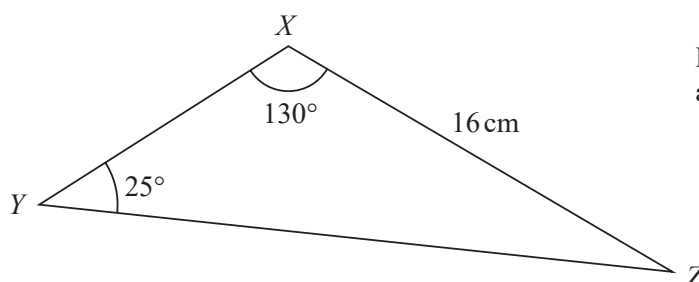


Diagram **NOT**
accurately drawn

The length XZ and the angles YXZ and XYZ are each given correct to 2 significant figures.

Calculate the upper bound for the length YZ .

Give your answer correct to one decimal place.

Show your working clearly.

..... cm

(Total for Question 13 is 3 marks)



18 $A = w - \frac{x^2}{y}$

$w = 3.45$ correct to 2 decimal places.

$x = 1.9$ correct to 1 decimal place.

$y = 5$ correct to the nearest whole number.

Work out the lower bound of the value of A

Show your working clearly.

.....
(Total for Question 18 is 3 marks)



18 $X = \frac{2a - b}{f}$

$a = 7.5$ correct to 1 decimal place.

$b = 3.42$ correct to 2 decimal places.

$f = 2$ correct to the nearest whole number.

Work out the upper bound of the value of X
Show your working clearly.

.....
(Total for Question 18 is 3 marks)



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

(Total for Question 16 is 3 marks)

17 $P = a(c + y)$

$a = 8.3$ correct to 2 significant figures

$c = 2$ correct to 1 significant figure

$y = 15$ correct to the nearest 5

Work out the upper bound for the value of P
Show your working clearly.

(Total for Question 17 is 3 marks)



18 The straight line **P** has equation $5y + 2x = 7$

Find the gradient of a straight line that is perpendicular to **P**

(Total for Question 18 is 2 marks)

19 $G = \frac{c}{2f - 3h}$

$c = 8$ correct to the nearest whole number

$f = 6.62$ correct to 2 decimal places

$h = 1.2$ correct to 1 decimal place

Work out the lower bound for the value of G

Give your answer correct to 3 decimal places.

Show your working clearly.

(Total for Question 19 is 3 marks)



19 Aviv goes on a cycle journey.

For the cycle journey

average speed = 19 km/h correct to the nearest whole number

time = 1.5 hours correct to one decimal place

Work out the upper bound for the distance Aviv travels.

Give your answer correct to 3 significant figures.

..... km

(Total for Question 19 is 3 marks)



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

$x = 28.4$ correct to 1 decimal place.

$y = 17$ correct to 2 significant figures.

$w = 90$ correct to the nearest 5

Calculate the upper bound for the value of T

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

(Total for Question 21 is 3 marks)



18 $P = \frac{a}{m - x}$

$x = 8$ correct to 1 significant figure

$a = 4.6$ correct to 2 significant figures

$m = 20$ correct to the nearest 10

Calculate the lower bound of P .

Show your working clearly.

(Total for Question 18 is 4 marks)



17 $P = ef$

$e = 4.8$ correct to 2 significant figures.

$f = 0.26$ correct to 2 significant figures.

- (a) Work out the lower bound for the value of P .
Show your working clearly.
Give your answer correct to 3 significant figures.

(2)

$$Q = \frac{t}{w}$$

$t = 2.73$ correct to 3 significant figures.

$w = 0.04$ correct to 1 significant figure.

- (b) Work out the upper bound for the value of Q .
Show your working clearly.
Give your answer correct to 2 significant figures.

(2)

(Total for Question 17 is 4 marks)



11 The weight of a cat is 4.3 kg correct to 2 significant figures.

(a) Write down the upper bound of the weight of the cat.

..... kg
(1)

(b) Write down the lower bound of the weight of the cat.

..... kg
(1)

$$G = e - f$$

$e = 17$ correct to the nearest integer

$f = 9.4$ correct to one decimal place

(c) Work out the upper bound for the value of G .

.....
(2)

(Total for Question 11 is 4 marks)



- 17 A metal block has a mass of 5 kg, correct to the nearest 50 grams.
The block has a volume of $(1.84 \times 10^{-3}) \text{ m}^3$, correct to 3 significant figures.

Work out the upper bound for the density of the block.
Give your answer in kg/m^3 correct to 1 decimal place.
Show your working clearly.

..... kg/m^3

(Total for Question 17 is 4 marks)



22 The diagram shows triangle ABC

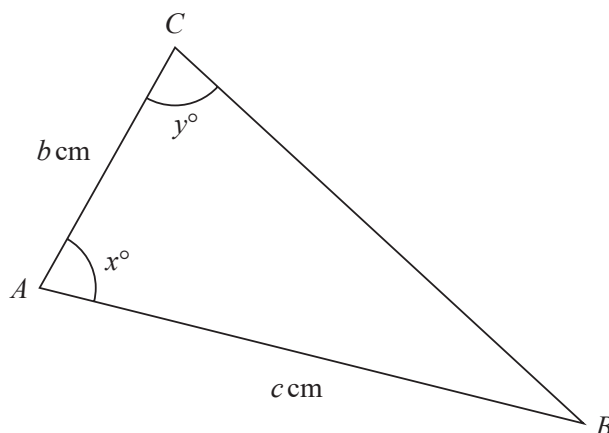


Diagram **NOT**
accurately drawn

$c = 11.5$ correct to one decimal place
 $x = 80$ correct to the nearest whole number
 $y = 75$ correct to the nearest whole number

Calculate the upper bound for the value of b
Show your working clearly.
Give your answer correct to 3 significant figures.

(Total for Question 22 is 4 marks)



18 Kaidan and Sonja went on two different car journeys.

For Kaidan's journey

distance = 80 km correct to the nearest 5 km

time = 2.7 hours correct to 1 decimal place

For Sonja's journey

distance = 33 km correct to 2 significant figures

time = 1 hour correct to the nearest 0.1 hour

Kaidan says,

“My average speed could have been greater than Sonja's average speed.”

By considering bounds, show that Kaidan is correct.

Show your working clearly.

(Total for Question 18 is 4 marks)



5 The weight of a cake is 2.75 kg, correct to 2 decimal places.

(a) Write down the lower bound of the weight of the cake.

..... kg
(1)

(b) Write down the upper bound of the weight of the cake.

..... kg
(1)

Penny has worked out $\frac{81.3 \times 59.2}{1.9^2}$ on her calculator.

Her answer is 13 332.299 17

Penny's answer is not sensible.

(c) By rounding each number to one significant figure, work out a suitable estimate to show that her answer is not sensible.
Show your working clearly.

(2)

(Total for Question 5 is 4 marks)



18 Diego builds a fence using fence panels.

The total length of the fence is 50 metres, correct to the nearest 5 metres.

The length of each fence panel is 1.3 metres, correct to the nearest 10 cm.

The cost of each fence panel is £8.65

Diego may only buy complete fence panels.

Diego only pays for the number of panels he needs to build the fence.

Work out the greatest difference in the possible amounts that Diego could pay to build the fence.

Show your working clearly.

£.....

(Total for Question 18 is 4 marks)



- 25 A solid sphere has a radius of 2.8 centimetres, correct to 1 decimal place.
The sphere has a mass of $M\pi$ grams, where $M = 260$ correct to 2 significant figures.

Work out the upper bound for the density of the sphere.
Give your answer in g/cm^3 correct to 2 decimal places.
Show your working clearly.

..... g/cm^3

(Total for Question 25 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS



22 The diagram shows a square inside rectangle $ABCD$

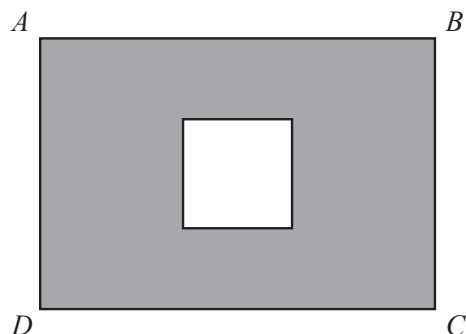


Diagram **NOT**
accurately drawn

The total area of the region shown shaded in the diagram is $X\text{cm}^2$

$AB = 11.5\text{ cm}$ correct to the nearest 0.5 cm

$BC = 9.2\text{ cm}$ correct to 2 significant figures

side of square $= 4.1\text{ cm}$ correct to 2 significant figures

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

$X = \dots\dots\dots$

(Total for Question 22 is 4 marks)



19 The acceleration, a , of an object is given by

$$a = \frac{v - u}{t}$$

where

$v = 45.23$ correct to 2 decimal places

$u = 5.12$ correct to 2 decimal places

$t = 8.5$ correct to 2 significant figures

By considering bounds, work out the value of a to a suitable degree of accuracy.
Show your working clearly and give a reason for your answer.

$a = \dots\dots\dots$

(Total for Question 19 is 5 marks)



SUB-TOPIC N4c

UNITS, TIME & MONEY

Sub-topic N4c · 1 question · 7 marks · lowest tariff first



6 Shane bought a car.

The amount Shane paid for the car was \$32 000

Theresa also bought a car.

To pay for this car, Theresa paid a deposit of \$18 000 together with 14 monthly payments of \$1160

Theresa paid more for her car than Shane paid for his car.

(a) Work out how much more Theresa paid as a percentage of the amount Shane paid.

..... %
(4)

Kylie bought a van.

After 1 year, the value of the van was \$39 865

During this year, the value of the van decreased by 15%

(b) Work out the value of the van when Kylie bought it.

\$.....
(3)

(Total for Question 6 is 7 marks)



MARK SCHEMES

official mark schemes, in the same order as the questions



5	(a)		33.75	1	B1 oe eg 33.750
	(b)		33.85	1	B1 allow 33.849 or 33.849 ^r or "33.8499..." do NOT allow 33.879 without indication of recurring "9"
Total 2 marks					

6	$\frac{70 \times 40}{0.02}$ or $\frac{68 \times 40}{0.02}$ or $\frac{70 \times 43}{0.02}$ or $\frac{68 \times 43}{0.02}$		2	M1 for a correct expression using a suitable approximation. 0.02 is the only acceptable denominator.
	$\frac{70 \times 40}{0.02} = 140\,000$ or $\frac{68 \times 40}{0.02} = \frac{2720}{0.02} = 136\,000$ or $\frac{70 \times 43}{0.02} = \frac{3010}{0.02} = 150\,500$ or $\frac{68 \times 43}{0.02} = \frac{2924}{0.02} = 146\,200$	Correct figures		A1 If student says 'no' then do not award the A mark rounded expression and evaluated answer required Intermediate step required unless rounded to 1sf For each, $\times 50$ (oe) may be seen in intermediate step. eg $\frac{68 \times 40}{0.02} = 2720 \times 50 = 136\,000$
				Total 2 marks



Question	Working	Answer	Mark	Notes
14 (a)		-6, 4, 0, -2, 4	2	B2 Award B1 for 2, 3 or 4 correct.
(b)		correct curve	2	B2 For correct smooth curve. If B2 not awarded, award B1 for at least 5 points plotted correctly ft from table dep on B1 or B2 in (a) (plots ± 1 sq)
(c)	$x^3 - 2x^2 - 3x + 4 = -2x + 3$		4	M1
	Plot $y = -2x + 3$			M1 Sufficient to cross curve at least once.
	-0.8 or 0.6 or 2.2			A1 Any one correct x value at intersection of graphs (or one or more points given as coordinates) ft dep on second M1 (Award even if curve in (a) is incorrect)
		-0.8 0.6 2.2	A1	Accept -0.9 to -0.7 Accept 0.4 to 0.7 Accept 2.1 to 2.4 (not coordinates) ft (± 1 square) dep on second M1 must be 3 values
				SC B2 for all correct solutions from graph of $y = x^3 - 2x^2 - x + 1$
				Total 8 marks
15	8.305–0.655		2	M1 For either bound correct (used or seen). Accept 0.6549
		7.65	A1	dep on correct method shown
				Total 2 marks



3	(a)	$\frac{12}{4}(=3)$ or $\frac{4}{12}(=0.3)$ or $\frac{BC}{4} = \frac{16.5}{12}$ or $BC \div 16.5 = 4 \div 12$ or $(BC \Rightarrow) 16.5 \div \frac{12}{4}$ oe		2	M1 correct scale factor (given as 3 or a fraction or a ratio) or correct equation using BC or a correct expression for BC (award for SF even if not used)
			5.5		A1
	(b)		$3x$	1	B1 allow $3 \times x$ or $x \times 3$ ft their “3” in (a)
					Total 3 marks

4	(a)	17.75	1	B1 oe
	(b)	18.25	1	B1 oe 18.249 (allow 18.249...)
				SC B1 for 17.5 in (a) and 18.5 (or 18.49) in (b)
				Total 2 marks

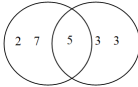


14	$\frac{0.515}{6.25}$		2	M1 For either bound correct (used or seen)
	Working required	0.0824		A1 dep on M1 Allow $\frac{103}{1250}$
Total 2 marks				

15	(a)	<table><tr><td>x</td><td>-2</td><td>-1</td><td>-0.5</td><td>0</td><td>1</td><td>1.5</td><td>2</td></tr><tr><td>y</td><td>0</td><td></td><td></td><td>2</td><td></td><td></td><td>4</td></tr></table>	x	-2	-1	-0.5	0	1	1.5	2	y	0			2			4		2	B2 (B1 for 1 or 2 correct)
	x	-2	-1	-0.5	0	1	1.5	2													
	y	0			2			4													
	(b)		correct curve	2	B2 For correct smooth curve. (there is an overlay for the curve – check the line now for (c)) If not B2, then B1 for at least 5 points plotted correctly ft from table dep on B1 or B2 in (a)																
(c)	$2x^3 - 6x + 4 = -3x$ or $x^3 - 3x + 2 = -\frac{3}{2}x$ or $y = -\frac{3}{2}x$ seen (allow $-\frac{3}{2}x$)		3	M1																	
	$y = -\frac{3}{2}x$ allow a correct line that intercepts with the curve eg of points on line (0, 0), (-1, 1.5), (-1.5, 2.25), (-2, 3)			M1 a correct line that intercepts with the curve (a correct line drawn implies M2)																	
	Answer dependent on a correct line being drawn	(x=) -1.6		A1ft accept -1.6 or -1.7 or ft their curve/line intercept dep on a correct line being drawn NB: if y value given as well then M2 only																	
						Total 7 marks															

2	(a)		1.45	1	B1 allow 1.449 or 1.44999(9...)
	(b)		1.35	1	B1 cao SCB1 for (a) 1.35 (b) 1.45 [score B0B1]
					Total 2 marks



International GCSE Maths										
Values in quotation marks must come from a correct method previously seen unless clearly stated otherwise.										
Q	Working	Answer	Mark	Notes						
1	45, 90, 135, 180... and 70, 140, 210, 280... or 2, 5, 7 and 3,3,5 or  or $\frac{45 \times 70}{5}$ or 2, 3, 3, 5, 7 oe or <table border="1"><tr><td>5</td><td>45</td><td>70</td></tr><tr><td></td><td>9</td><td>14</td></tr></table> or 5, 9, 14 oe	5	45	70		9	14		2	M1 for any correct valid method eg for starting to list at least four multiples of each number or 2, 5, 7 and 3, 3, 5 seen (may be in a factor tree, ignore 1) or a fully correct Venn diagram or 5, 9, 14 oe (could be in a table)
5	45	70								
	9	14								
	Correct answer scores full marks (unless from obvious incorrect working)	630		A1 Allow $2 \times 3^2 \times 5 \times 7$ oe eg $5 \times 9 \times 14$						
				Total 2 marks						

2	(i)	142.75	1	B1
	(ii)	142.85	1	B1 accept 142.8499... or 142.849
				Total 2 marks

Question	Working	Answer	Mark	Notes
19	8.35, 8.45, 6.25, 6.35, 0.265, 0.275	8.3	3	M1 For sight of 8.35, 8.45, 6.25, 6.35, 0.265 or 0.275
	$(a =) \frac{8.45 - 6.25}{0.265}$			M1 $a = \frac{UB - LB_1}{LB_2}$ Where $8.4 < UB \leq 8.45$ and $6.25 \leq LB_1 < 6.3$ and $0.265 \leq LB_2 < 0.27$
				A1 8.3(018867...) dep on M2
				Total 3 marks
20	eg $(4x + 3)(x - 2)$ or $(x =) \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 4 \times (-6)}}{2 \times 4}$	$x < -\frac{3}{4}$ $x > 2$	4	M first step to finding the critical values
	$(x =) -\frac{3}{4}$ and 2			A for two correct critical values
				M (dep on two critical values having been found) 1 for a diagram showing the inequalities OR $x < a$ and $x > b$ where a is their lower critical value and b is their upper critical value OR $x > 2$ OR $x < -\frac{3}{4}$ OR $-\frac{3}{4} > x > 2$
				A for both correct inequalities
				Total 4 marks

11		5.5 or 6.5 or 12.5 or 17.5		3	M1 Accept 6.49 for 6.5 and 17.49 for 17.5
		17.5 – 5.5			M1 for UB – LB where $15 < UB \leq 17.5$ and $5.5 \leq LB < 6$
			12		A1 dep on M2



Question	Working	Answer	Mark	Notes
19	$\frac{25}{2}\pi = \pi r^2 \times \frac{80}{360}$ $r = 7.5$ $(APB \Rightarrow) 2 \times \pi \times 7.5 \times \frac{80}{360} (= 10.471) \dots$ $(APB \Rightarrow) 10.471 \dots (= 10\pi/3)$ $(AB^2) = 7.5^2 + 7.5^2 - (2 \times 7.5 \times 7.5 \times \cos 80)$ Or $\frac{AB}{\sin 80} = \frac{7.5}{\sin 50}$ or $(AB \Rightarrow) 2 \times 7.5 \times \sin 40$ $(AB \Rightarrow) 9.6418$ $"9.6418" + "10.4719"$	20.1	6	M1 Equation of sector equal to $\frac{25\pi}{2}$ or a calculation that leads to r or r^2 A1 M1 ft Dep on 1 st M1 Accept 10.5 or better M1 ft Dep on 1 st M1 Correct equation to find AB ($= 9.6$) or AB^2 ($= 93$ or better) must use a clearly identified radius value M1 ft A1 Dep on 2 nd and 3 rd method marks awrt 20.1
Total 6 marks				
20	3.455 or 3.465 or 6.25 or 6.35 $\frac{6 \times 3.465}{6.25 - 3.465}$	7.46	3	M1 Accept 3.4649 for 3.465 or 6.349 for 6.35 M1 $\frac{6 \times UB_a}{LB_b - UB_a}$ where $3.46 < UB_a \leq 3.465$ and $6.25 \leq LB_b < 6.3$ A1 Dep M2 Accept $7.46499 \dots$
Total 3 marks				
21	$(LSF \Rightarrow) \sqrt{240 \div 540}$ or $\frac{2}{3}$ or $\frac{3}{2}$ or 1.5 or $3 : 2$ or $2 : 3$ $(\frac{2}{3})^3 \times 2025$ or accept 0.066 or better for $2/3$	600	3	M1 Full method leading to correct answer M1 A1
Total 3 marks				



16	58.35 or 58.45 or 19.5 or 20.5 or 3.55 or 3.65		3	B1 for any correct bound Accept $58.44\dot{9}$ for 58.45 or $20.4\dot{9}$ for 20.5 or $3.64\dot{9}$ for 3.65
	$\frac{2 \times 58.45 - 19.5}{3.55}$ (= 27.4366...)			M1 for correct substitution into $\frac{2 \times a_{UB} - c_{LB}}{d_{LB}}$ where $58.4 < a_{UB} \leq 58.45$ and $19.5 \leq c_{LB} < 20$ and $3.55 \leq d_{LB} < 3.6$
		27.44		A1 from correct working allow 27.4 – 27.5
				Total 3 marks



19	8.35 or 7.25 or 6.15 or 5.25		3	B1
	$(8.35 \times 7.25) - (6.15 \times 5.25)$			M1 Allow $UB_{AD} \times UB_{DC} - LB_{EH} \times LB_{HG}$ where $8.3 < UB_{AD} \leq 8.35$, $7.2 < UB_{DC} \leq 7.25$ $6.15 \leq LB_{EH} < 6.2$, $5.25 \leq LB_{HG} < 5.3$
		28.25		A1 oe, dep on M1
				Total 3 marks

20	(i)		$(-3, -2)$	1	B1
	(ii)		$(-1.5, 4)$	1	B1 oe
					Total 2 marks



15	9.55 or 9.65 or 3.75 or 3.85 or 1.835 or 1.845		3	B1 accept 9.649 for 9.65, 3.849 for 3.85, 1.8449 for 1.845
	$a = \frac{UB_v - LB_u}{LB_l}$ e.g. $a = \frac{9.65 - 3.75}{1.835} (= 3.2152...)$			M1 for correct substitution of 9.6 < UB_v < 9.65 and 3.75 < LB_u < 3.8 and 1.835 < LB_l < 1.84
		3.22		A1 accept 3.21 – 3.22 from correct working
Total 3 marks				



19	7.75, 7.85, 3.35, 3.45, 13.5, 14.5		3	B1 for sight of a correct upper or lower bound Accept $3.44\dot{9}$ for 3.45 or $7.84\dot{9}$ for 7.85 or $14.4\dot{9}$ for 14.5
	$(k =) \frac{13.5}{7.85 - 3.35}$			M1 for correct substitution into $k = \frac{t_{LB}}{a_{UB} - h_{LB}}$ where $13.5 \leq t_{LB} < 14$ and $7.8 < a_{UB} \leq 7.85$ and $3.35 \leq h_{LB} < 3.4$
		3		A1 accept 3.0
				Total 3 marks

19	(i)		45	3	B1
	(ii)		12		B1
	(iii)		28		B1
					Total 3 marks

20		9.65, 9.75, 5.85, 5.95, 2.5, 3.5		3	B1 for any one of these stated or used, accept 9.749, 5.949, 3.49
		$\frac{9.75 - 5.85}{2.5}$			M1 for $\frac{UB_t - LB_w}{LB_y}$ where 9.7 < UB _t ≤ 9.75, 5.85 ≤ LB _w < 5.9, 2.5 ≤ LB _y < 3 This allows for the student who uses some sort of lower/upper value, but are slightly inaccurate eg using 9.74 for t
		Working required	1.56		A1 dep on previous marks (as working is requested)
					Total 3 marks

13	15.5 or 16.5 or 24.5 or 25.5 or 125 or 135		3	B1 Accept 16.49 for 16.5 25.49 for 25.5 134.9 for 135
	$\frac{(YZ)}{\sin(125)} = \frac{16.5}{\sin(24.5)}$ oe			M1 for substitution into sine rule $\frac{(YZ)}{\sin(LB_2)} = \frac{UB_1}{\sin(LB_3)}$ oe where 16 < $UB_1 \leq 16.5$ and 125 $\leq LB_2 < 130$ and 24.5 $\leq LB_3 < 25$
	Working required	32.6		A1 Accept 32.5 to 32.6 from correct working
				Total 3 marks



17	eg $2^3 : 3^3$ or $8 : 27$ or $10^3 : 15^3$ oe or $\left(\frac{15}{10}\right)^3$ or $1.5^3 (= 3.375)$ or $\left(\frac{3}{2}\right)^3 \left(\frac{27}{8}\right)$ or $\left(\frac{10}{15}\right)^3$ or $\left(\frac{2}{3}\right)^3 \left(\frac{8}{27}\right)$		4	M1 for a correct ratio or scale factor for the volumes
	eg $\frac{1197}{27-8}$ or $\frac{1197}{15^3-10^3}$ or $\frac{1197}{8} V_A - V_A = 1197$ oe or $\frac{19}{8} V_A = 1197$ oe			M1 for a correct method to find the value of 1 share of volume or for setting up a correct equation using the scale factor for the volumes
	eg $8 \times \frac{1197}{27-8}$ or $10^3 \times \frac{1197}{15^3-10^3}$ or $\frac{8}{19} \times 1197$ oe			M1 complete correct method to find volume of vase A
		504		A1
				Total 4 marks
18	3.445, 3.455, 1.85, 1.95, 4.5, 5.5		3	B1 any one bound
	$(A =) 3.445 - \frac{1.95^2}{4.5}$			M1 $A = LB_w - \frac{(UB_x)^2}{LB_y}$ where $3.445 \leq LB_w < 3.45$, $1.9 < UB_x \leq 1.95$, $4.5 \leq LB_y < 5$
		2.6		A1 oe, (dep on M1), from correct figures (3.445, 1.95, 4.5)
				Total 3 marks



17	$M = kh^3$ oe or $4 = k \times 0.5^3$ oe		4	M1 $k \neq 1$ and where k could be any letter	M2 for $\frac{500}{4} = \frac{h^3}{0.5^3}$ oe or $125 \times 0.5^3 (= 15.625)$ oe
	$k = \frac{4}{0.5^3}$ or $k = \frac{4}{0.125}$ or $k = 32$			M1 Allow this for M2 if $M = kh^3$ is not written	
	$h = \sqrt[3]{\frac{500}{32}}$ or $\sqrt[3]{\frac{500 \times 0.5^3}{4}}$ or $\sqrt[3]{15.625}$ or $h = 5 \times 0.5$			M1 for a correct expression for h using correct values or a value of k from a completely correct method	
		2.5		A1 oe	
				Total 4 marks	

18	7.45, 7.55, 3.415, 3.425, 1.5, 2.5		3	B1 For one correct upper or one correct lower bound Allow 7.549 for 7.55, 3.4249 for 3.425, 2.49 for 2.5	
	$(X \Rightarrow) \frac{2 \times 7.55 - 3.415}{1.5}$ oe eg $\frac{11.685}{1.5}$			M1 $\frac{2 \times UB_o - LB_o}{LB_f}$ where $7.5 < UB_o \leq 7.55$, $3.415 \leq LB_o < 3.42$, $1.5 \leq LB_f < 2$ (also award this mark for $\frac{7.55 - 3.415}{1.5}$ or $\frac{2(7.55 - 3.415)}{1.5}$)	
		7.79		A1 must be from correct working	
				Total 3 marks	



Question	Working	Answer	Mark	Notes
17	8.25, 8.35, 2.5, 1.5, 17.5, 12.5		3	B1 For any one of these stated or used accept $8.34\dot{9}$, $2.4\dot{9}$, $17.4\dot{9}$
	$8.35(2.5+17.5)$ oe			M1 For $UB_a(UB_c + UB_y)$ $8.3 < UB_a \leq 8.35$, $2 < UB_c \leq 2.5$ $15 < UB_y \leq 17.5$ (this allows for the student who uses some sort of upper value, but is slightly inaccurate, eg using 17.4 for y)
	Working required	167		A1 cao dep on previous marks
				Total 3 marks

19	7.5, 8.5, 6.615, 6.625, 1.15, 1.25		3	B1 For a correct upper or lower bound Allow 8.49 for 8.5, 6.6249 for 6.5, 1.249 for 1.25
	$(G =) \frac{7.5}{2 \times 6.625 - 3 \times 1.15} \left(= \frac{7.5}{13.25 - 3.45} = \frac{7.5}{9.8} = \frac{75}{98} \right)$			M1 $\frac{LB_c}{2 \times UB_f - 3 \times LB_h}$ where 7.5,, $LB_c < 8$ $6.62 < UB_f$,, 6.625, 1.15,, $LB_h < 1.2$ SCB1 for $\frac{7.5}{6.625 - 1.15} (= 1.369(8...))$ [in addition to the first B1]
	working required	0.765		A1 awrt 0.765 dep on completely correct bounds (0.7653061224...) dep on M1
				Total 3 marks



19	18.5 or 19.5 or 1.45 or 1.55		3	B1 for one correct bound Allow 19.49 for 19.5 Allow 1.549 for 1.55
	(distance =) 19.5×1.55			M1 for $UB_s \times UB_t$ where $19 < UB_s, 19.5$ and $1.5 < UB_t, 1.55$
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	30.2		A1 accept 30.225 or 30.23 answer must come from correct figures (19.5, 1.55)
				Total 3 marks

21	28.35 or 28.45 or 16.5 or 17.5 or 87.5 or 92.5		3	B1 Accept 28.449 for 28.45 17.49 for 17.5
	$(T =) \frac{28.45^2 + 17.5^2}{87.5} (= 12.75031429)$			M1 for substituting the correct bounds into the formula for T $(T =) \frac{UB_x^2 + UB_y^2}{LB_w}$ where $28.4 < UB_x \leq 28.45$ $17 < UB_y \leq 17.5$ $87.5 \leq LB_w < 90$
	Working required	12.8		A1 awrt 12.8 dep on M1 Answer must come from correct figures (28.45, 17.5 and 87.5)
				Total 3 marks



Question	Working	Answer	Mark	Notes
16	e.g. $\sqrt[3]{\frac{960}{405}} \left(= \frac{4}{3} \right) (=1.3...)$ or $\sqrt[3]{\frac{405}{960}} \left(= \frac{3}{4} \right) (=0.75)$ $\left(\frac{3}{4} \right)^2 \times 928$ or $928 \div \left(\frac{4}{3} \right)^2$ oe	522	3	M1 for a correct linear scale factor M1 for a complete method A1
17 (a) (b) (c)	$g(-1.5) = 1 \div (1 - 2 \times -1.5) (=0.25)$ or $fg(x) = 4 - 3 \times \left(\frac{1}{1 - 2x} \right)$ oe	-11 0.5 oe	1 1	B1 B1 M1 $g(-1.5)$ must be the correct calculation alone.
18	7.5 or 8.5 or 4.65 or 4.55 25 or 15 $\frac{4.55}{25 - 7.5}$	3.25 oe	2	A1
		0.26 oe	4	M1 M1 M1 for $\frac{LB_1}{UB - LB_2}$ with $4.55 \leq LB_1 < 4.6$ and $20 < UB \leq 25$ and $7.5 \leq LB_2 < 8$ A1 for 0.26 from correct working



Question	Working	Answer	Mark	Notes
17	(a) 4.75×0.255	1.21	2	M1 for 4.75 or 0.255 seen A1 1.21125
	(b) $2.735 \div 0.035$	78	2	M1 2.735 or 0.035 seen A1 78.142857...
18	(a) (0, 1), (90, 0), (180, -1), (270, 0), (360, 1)	Curve through given coordinates	2	M1 for a translation of the curve parallel to the x axis or for a curve going through 3 correct points A1 fully correct
	(b)	(180, 4)	2	M1 1 coordinate correct or a sketch of $\sin\left(\frac{x}{2}\right)^0$ A1 for (180, 4)



11	a		4.35	1	B1 accept 4.34
	b		4.25	1	B1 cao
	c	17.5 or 9.35 or $e - f$ where $17 < e \leq 17.5$ and $9.35 \leq f < 9.4$			M1
			8.15	2	A1
Total 4 marks					
12	a		23	1	B1 accept 22 – 24
	b	e.g. 29 – 17			M1 For subtracting readings from 15 and 45
			12	2	A1 accept 10 – 14
	c				B1 ft comparison of the medians
			Two comparisons (at least one of which must be in context)	2	B1 ft comparison of the IQR
					Note: to award 2 marks at least one comparison must be in context
Total 5 marks					



17	5025 or 5.025 or 4975 or 4.975		4	B1 Accept $\dot{5024.9}$ for 5025 or $\dot{5.0249}$ for 5.025
	1.845×10^{-3} oe or 1.835×10^{-3} oe			B1 Accept $\dot{1.8449} \times 10^{-3}$ for 1.845×10^{-3}
	$\frac{5.025}{1.835 \times 10^{-3}} (= 2738.4...) \text{ oe}$			M1 for correct substitution into $\frac{m_{UB}}{v_{LB}}$ where $5 < m_{UB} \leq 5.025$ and $1.835 \times 10^{-3} \leq v_{LB} < 1.84 \times 10^{-3}$
		2738.4		A1 dep on correct working
Total 4 marks				



22	11.45 or 11.55 or 79.5 or 80.5 or 74.5 or 75.5		4	B1 Accept 11.549 for 11.55 80.49 for 80.5 75.49 for 75.5
	$180 - (74.5 + 79.5) (= 26)$			M1 for a correct calculation to find the upper bound of angle B NB $180^\circ - (LB \text{ of } 75^\circ + LB \text{ of } 80^\circ)$
	$\frac{(AC)}{\sin(26)} = \frac{11.55}{\sin(74.5)}$ oe or $\frac{(AC)}{\sin(180 - 74.5 - 79.5)} = \frac{11.55}{\sin(74.5)}$			M1 for substituting the correct bounds into the sine rule $\frac{(YZ)}{\sin("26") } = \frac{UB_1}{\sin(LB_2)}$ oe where $11.5 < UB_1 \leq 11.55$ and $74.5 \leq LB_2 < 75$
		5.25		A1 awrt 5.25 from correct working
				Total 4 marks

18	77.5 or 82.5 or 2.65 or 2.75 or 32.5 or 33.5 or 0.95 or 1.05 or 77500 or 82500 or 159 or 165 or 32500 or 33500 or 57 or 63		4	B1 For a <i>UB</i> or <i>LB</i> for one of the distances or times in hours or in minutes
	eg $82.5 \div 2.65 (= 31.13\dots)$ or $82500 \div 159 (= 518.867\dots)$ or km/min or m/h			M1 for a method to find the upper bound of Kaidan's average speed eg $UB_K \div LB_K$ where $80 < UB_K \leq 82.5$ and $2.65 \leq LB_K < 2.7$ or use of m/min to find upper bound for Kaidan's average speed eg $UB_K \div LB_K$ where $80000 < UB_K \leq 82500$ and $159 \leq LB_K < 162$ can use km/min or m/h
	eg $32.5 \div 1.05 (= 30.95\dots)$ or $32500 \div 63 (= 515.873\dots)$ or km/min or m/h			M1 indep for a method to find the lower bound of Sonja's average speed eg $LB_S \div UB_S$ where $32.5 \leq LB_S < 33$ and $1 < UB_S \leq 1.05$ or use of m/min to find lower bound for Sonja's average speed $LB_S \div UB_S$ where $32500 \leq LB_S < 33000$ and $60 < UB_S \leq 63$ can use km/min or m/h
	$UB_K = 31132\dots\text{m/h}$ $LB_S = 30952\dots\text{m/h}$ $UB_K = 0.51886\dots\text{km/min}$ $LB_S = 0.51587\dots\text{km/min}$	Shown		A1 shown with accurate figures in the same units – sufficient figures for comparison (can be truncated) but must be from correct working and <i>UB</i> for Kaidan and <i>LB</i> for Sonja selected eg $UB_K = 31.13\dots$ (km/h) and $LB_S = 30.95\dots$ (km/h) or $UB_K = 518.867\dots$ (m/min) and $LB_S = 515.873\dots$ (m/min) (dep on correct method)
Total 4 marks				

Question	Working	Answer	Mark	Notes
4	eg $5x - 1 = 3x + 7.4$ oe or eg $10x - 2 + 48$ or $6x + 14.8 + 48$ or $24 + 24 + 5x - 1 + 3x + 7.4$ oe		4	M1 a correct equation to find x or a correct expression for the perimeter in terms of x
	$x = 4.2$			A1 the correct value of x (implies previous mark)
	$2 \times 24 + 2(5 \times "4.2" - 1)$ oe or $2 \times 24 + 2(3 \times "4.2" + 7.4)$ oe or $2 \times 24 + (5 \times 4.2 - 1) + (3 \times 4.2 + 7.4)$ oe eg $24 + 24 + 20 + 20$ oe			M1dep on a correct method to find the perimeter – use of positive x from correct working (1 st M1 awarded for an equation) and only if used the same measurement for AD and BC
	working required	88		A1 cao dep on either M1 or $x = 4.2$
Total 4 marks				

Question	Working	Answer	Mark	Notes
5 (a)		2.745	1	B1
(b)		2.755	1	B1 allow 2.7549
(c)	$(80 \times 60) \div 2^2$		2	M1 For two of 80, 60, 2 or 4 rather than 2^2 oe
	eg $(80 \times 60) \div 2^2 = 1200$ oe working with rounded values seen required	1200		A1 dep on M1 for answer coming from use of the 3 rounded numbers – if 1200 seen then ignore any other working and comments
Total 4 marks				



18	47.5 or 52.5 or 1.25 or 1.35		4	B1 for a correct bound, accept 4750 or 5250 or 125 or 135 if working in cm
	eg $\frac{47.5}{1.35}$ (= 35.18...) or $\frac{52.5}{1.25}$ (= 42)			M1 for correct substitution of $47.5 \leq LB_F < 50$ and $1.3 < UB_{FP} \leq 1.35$ or $50 < UB_F \leq 52.5$ and $1.25 \leq LB_{FP} < 1.3$
	eg ("42" – "36") $\times$ 8.65 or "42" $\times$ 8.65 – "36" $\times$ 8.65 or 363.3 – 311.4			M1 (dep on M1) for using their lower and upper bounds for the number of fence panels needed to find the cost – lower bound and/or upper bound must be an integer rounded up
	Working required	51.9(0)		A1 cao dep on M2
				Total 4 marks



24	$\frac{-5-10}{4-2} (= -\frac{5}{2})$		6	M1	A correct method to find the gradient of AC
	$y-10 = -\frac{5}{2}(x+2)$ oe eg $y = -\frac{5}{2}x + 5$ or $y-5 = -\frac{5}{2}(x-4)$ oe or $5x+2y=10$ oe			M1	ft (if M1 scored) correct equation of AC
	$y-4 = \frac{2}{5}(x-\frac{27}{5})$ oe or $4 = \frac{2}{5}(-\frac{27}{5}) + c$ $(y = \frac{2}{5}x + 6.16)$ $\frac{4-y}{-\frac{27}{5}-x} = \frac{2}{5}$ oe or $5y-2x = \frac{154}{5}$ oe			M1	ft (if first M1 scored) equation of BD or correct equation using gradient of BD
	solves $-\frac{5}{2}x + 5 = \frac{2}{5}x + 6.16$ oe eg $10x + 4y = 20$ oe, with operation of addition or $-10x + 25y = 154$ $25x + 10y = 50$ oe, with operation of subtraction or $-4x + 10y = 61.6$ $x = \frac{5}{2}y - \frac{154}{10}$ oe or $y = \frac{2}{5}x + \frac{154}{25}$ oe substituted in other equation			M1	Solve equation OR Solve simultaneously the correct equations of lines of AC and BD or correct equation from gradient or other correct equation. If elimination: same coefficient of x or y with suitable sign used to eliminate. If substitution: x or y substituted into other equation.
	Coordinates of intersection of AC and BD : $x = -\frac{2}{5}, y = 6$			M1	oe value of x and y at intersection of AC and BD
	Correct answer scores full marks (unless from obvious incorrect working)	(4.6, 8)		A1	oe coordinates of D
	See next page for working with AD = AB, CD = CB or gradients				Total 6 marks



24	eg $(10-4)^2 + \left(-2 + \frac{27}{5}\right)^2 (= 47.56)$ ($AB = 6.896\dots$) or eg $(-5-4)^2 + \left(4 + \frac{27}{5}\right)^2 (= 169.36)$ ($CB = 13.013\dots$) or eg $\frac{-5-10}{4-2}$ or $\frac{4-y}{\frac{27}{5}-x}$ oe		6	M1 A correct method to find AB^2 or CB^2 or AB or CB or a correct gradient expression for AC or DB
	eg $(y-10)^2 + (x+2)^2 = (10-4)^2 + \left(-2 + \frac{27}{5}\right)^2$ or eg $(y+5)^2 + (x-4)^2 = (-5-4)^2 + \left(4 + \frac{27}{5}\right)^2$ or $\frac{-5-10}{4-2} \times \frac{4-y}{\frac{27}{5}-x} = -1$ oe eg $-60 + 15y = 6x + 32.4$			M1 Using $D(x, y)$ form a correct equation $AD^2 = AB^2$ or $CD^2 = CB^2$ or gradients $AC \times DB = -1$ (Using $D(x, y)$)
	eg $2x - 5y = -30.8$ or $x = 2.5y - 15.4$ or $y = 0.4x + 6.16$ oe			M1 uses rearrangement or solving simultaneous equations to find a correct 3 term linear equation
	eg $(y-10)^2 + (2.5y-15.4+2)^2 = (10-4)^2 + \left(-2 + \frac{27}{5}\right)^2$ eg $(0.4x+6.16+5)^2 + (x-4)^2 = (-5-4)^2 + \left(4 + \frac{27}{5}\right)^2$			M1 uses substitution to obtain a correct quadratic equation in one unknown
	$7.25y^2 - 87y + 232 = 0$ oe or $1.16x^2 + 0.928x - 28.8144 = 0$ oe			M1 for a 3 term quadratic that can be used to find the value of x or the value of y at D
		(4.6, 8)		A1 oe coordinates of D
Total 6 marks				



25	255 or 265 or 2.85 or 2.75		4	B1 for sight of a correct upper or lower bound
	$(V =) \frac{4}{3}\pi \times (2.75)^3$ $(= \frac{1331}{48}\pi \text{ or } 87.1137\dots)$			M1 calculation to find V using $V = \frac{4}{3}\pi r_{LB}^3$ where $2.75 \leq r_{LB} < 2.8$ or use of 2.85
	$(D =) \frac{265\pi}{\frac{4}{3} \times \pi \times 2.75^3}$ (condone missing π for 265π (also may have cancelled out π))			M1 method to find UB of density, using LB of V and UB of M for correct substitution into $D = \frac{\pi M_{UB}}{V_{LB}}$ where $260 < M_{UB} \leq 265$ and $87.11\dots \leq V_{LB} < 91.95\dots$ oe
		9.56		A1 dep on M2 and all correct bounds used allow 9.55 - 9.56
				Total 4 marks



Question	Working	Answer	Mark	Notes
22	11.25, 11.75, 9.15, 9.25, 4.05, 4.15		4	B1 for a correct bound Accept 11.749 for 11.75 or 11.749 for 11.75 9.249 for 9.25 or 9.249 for 9.25 4.149 for 4.15 or 4.149 for 4.15
	$11.75 \times 9.25 - 4.05^2 (=92.285)$			M1 for a correct method to find the UB of X, allow $(11.5 < AB \leq 11.75) \times (9.2 < BC \leq 9.25) - ((4.05 \leq s < 4.1)^2)$
	$11.25 \times 9.15 - 4.15^2 (=85.715)$			M1 for a correct method to find the LB of X, allow $(11.25 \leq AB < 11.5) \times (9.15 \leq BC < 9.2) - ((4.1 < s \leq 4.15)^2)$
	Working required	90		A1 dep on M2 90 and both UB and LB correct using correct values 11.25, 11.75, 9.15, 9.25, 4.05 and 4.15
				Total 4 marks



19	45.225 or 45.235 or 5.115 or 5.125 or 8.45 or 8.55		5	B2 for all 6 correct (B1 for 4 or 5 correct) Accept $45.234\dot{9}$ for 45.235 $5.124\dot{9}$ for 5.125 $8.54\dot{9}$ for 8.55
	$\frac{45.235 - 5.115}{8.45} (= 4.7479\dots)$			M1 for correct substitution into the <i>UB</i> $a = \frac{v-u}{t}$ where $45.23 < v_{(UB)} \leq 45.235$ $5.115 \leq u_{(LB)} < 5.12$ $8.45 \leq t_{(LB)} < 8.5$
	$\frac{45.225 - 5.125}{8.55} (= 4.6900\dots)$			M1 for correct substitution into the <i>LB</i> $a = \frac{v-u}{t}$ where $45.225 \leq v_{(LB)} < 45.23$ $5.12 < u_{(UB)} \leq 5.125$ $8.5 < t_{(UB)} \leq 8.55$
	<i>Working required</i>	4.7 and correct reason		A1 dep on M2 4.7 and both answers round to 4.7 oe e.g. 1 dp or 2 sf
Total 5 marks				

6	(a)	$18\,000 + 14 \times 1160 (= 34\,240)$ oe or $18\,000 + 16\,240 (= 34\,240)$		4	M1
		$"34\,240" - 32\,000 (= 2240)$ or $\frac{"34\,240"}{32\,000} (= 1.07)$			M1
		$\frac{"2240"}{32\,000} (\times 100)$ or $\frac{"34\,240"}{32\,000} \times 100 (= 107)$ or $"1.07" - 1 (= 0.07)$			M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	7		A1
	(b)	e.g. $1 - 0.15 (= 0.85)$ or $100(\%) - 15(\%) (= 85(\%))$		3	M1
		e.g. $39\,865 \div 0.85$ or $39\,865 \div 85 \times 100$ oe			M1
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	46 900		A1
					Total 7 marks