Chhetri Academy

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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 50

Bearings and scale drawings

Higher tier

Answers and examiner comments

41	2003-2024	Higher
question groups	available papers	tier

Using this booklet

1. Answer numbers match the companion question booklet.
2. Follow the original question number on marking tables.
3. Examiner comments are included where available.

Name _____ **Date** _____

Some entries use full source marking material in an appendix. Any unavailable mark schemes are identified beside the relevant answer.

Original question 5

No matching mark scheme was available in the supplied archive for this question.

Original question 10

The full source mark scheme begins on page 65. Use the original paper code, tier and question number shown above.

Original question 4

No matching mark scheme was available in the supplied archive for this question.

5	(a)		116	1	B1 for 116 [accept 114 if 116 seen on the dotted line in the sequence]
	(b)		112	1	B1 cao
	(c)		it is odd (and all the terms are even)	1	B1 for a correct reason

Question		Working	Answer	Mark	Notes
7	(a)		08 30	1	B1 for 08 30 oe
	(b)		17	1	B1 cao
	(c)		10 15	1	B1 for 10 15 oe

11	(a)		060°	1	B1 (0)57° – (0)62°
	(b)		Cross C	2	B1 cross 4 cm (±0.2cm) from B B1 cross 160° (±2°) from B [SC: B1 cross 4cm and 160° from A)

1380 3H

1380/3H

7	(a)		Reflection	2	B2 for vertices of shape plotted at (-3, 2), (-3, 3), (-5, 3), (-6, 2.5), (-5, 2) (B1 for a reflection in any vertical or horizontal line)
	(b)		Translation; $\begin{pmatrix}-6\\-1\end{pmatrix}$	2	B1 for translation B1 (indep.) for 6 left and 1 down OR $\begin{pmatrix}-6\\-1\end{pmatrix}$ Note B0 if more than one transfomation given

1380_3H

Original question 14

The full source mark scheme begins on page 126. Use the original paper code, tier and question number shown above.

10			Region shaded	3	B1 for circle arc of radius 3cm (± 2mm) centre Burford B1 for circle arc of radius 5 cm (± 2mm) centre Hightown B1 for overlapping regions of circle arcs shaded

Question		Working	Answer	Mark	Notes
14			230	2	M1 for 180 + 50 A1 cao **OR** M1 for 360 – (180 – 50) or 360 – 130 A1 cao **OR** M1 for 50 + (90 – 50) + 90 + 50 or 50 + 40 + 90 + 50 A1 cao **OR** M1 for a suitable diagram (sketch) with bearing of lighthouse from ship indicated and 50° marked at lighthouse; diagram only intended to indicate position of 50°; ignore other labels and markings unless they create ambiguity. A1 cao

Question		Working	Answer	Mark	Notes
19		16 metres: 8×10^8 km. 16: $8 \times 10^8 \times 1000$ 16: 8×10^{11} 1: 5×10^{10} **OR** 2 m to 10^8 km 2m to 100 000 000 000m 1m to 50 000 000 000m	1: 5×10^{10}	3	M1 (indep) correct method to convert to consistent units M1 $\frac{'8\times10^8'}{'16'}$ (units may not be consistent) **or** 5×10^{10} oe **or** 5×10^7 oe A1 1: 5×10^{10} **or** 1: 50 000 000 000 **OR** M1 (indep) correct method to convert to consistent units M1 $\frac{'16'}{8}$ to $'10^8'$ A1 1: 5×10^{10} **or** 1: 50 000 000 000

Question		Working	Answer	Mark	Notes
5		64 ÷ 10 = 6.4 arc of radius 6.4cm drawn with cross at 70^o OR 64 ÷ 10 = 6.4 line drawn at 70^o with cross at 6.4cm	Town *B* marked	2	B2 town *B* marked in correct place (B1 bearing $070^o \pm 2^o$ or 6.4 ± 0.2cm)

Question		Working	Answer	Mark	Notes
15			Required region	4	M1 arc radius 5 cm centre *C* M1 bisector of angle *BAD* M1 line 3 cm from *DC* A1 for correct region identified (see overlay)

Original question 3

The full source mark scheme begins on page 146. Use the original paper code, tier and question number shown above.

Original question 13

The full source mark scheme begins on page 161. Use the original paper code, tier and question number shown above.

6			Correct position of T	3	M1 for line drawn or point marked within guidelines from B M1 for line drawn or point marked within guidelines from C A1 for T within region on overlay

PAPER: 5MB3H_01

7		Correct region shaded	3	B1 for perpendicular bisector within guidelines B1 for arc of circle, centre A, within guidelines B1 ft for a correct region shaded or otherwise indicated from their perpendicular bisector of AB and their arc drawn, centre A

PAPER: 5MB3H_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
*8	179 ÷ 70 = 2.5(571.....) 275 ÷ 100 = 2.7(5) 399 ÷150 = 2.6(66....)	70 m*l* tube with reason	4	**Using pence per m*l*** M1 for a correct method of finding the cost per millilitre (or cost/10 m*l* etc) for one of the sizes M1 for a correct method of finding the cost per millilitre (or cost/10 m*l* etc. must be consistent) for each of the sizes A1 for 2.5(571.....) (70 m*l*) and 2.7(5) (100 m*l*) and 2.6(66....) (150 m*l*) or equivalent depending upon units used. These values can be rounded or truncated as long as they remain different C1 (dep on M1) for selecting the tube with the best value for money based upon a comparison of their 3 values. OR **Using m*l* per 1p** M1 for a correct method of finding the volume per pence (or £) for one of the sizes M1 for a correct method of finding the volume per pence (or £) for each of the sizes, with consistent units A1 for 0.39(11....) (70 m*l*) and 0.36(36...) (100 m*l*) and 0.37(59....) (150 m*l*) or equivalent depending upon units used. These values can be rounded or truncated as long as they remain different C1 (dep on M1) for selecting the tube with the best value for money based upon a comparison of their 3 values.
	70 ÷ 179 = 0.39(11....) 100 ÷ 275 = 0.36(36...) 150 ÷399 = 0.37(59....)			

7		Correct region shaded	3	B1 for perpendicular bisector within guidelines B1 for arc of circle, centre A, within guidelines B1 ft for a correct region shaded or otherwise indicated from their perpendicular bisector of AB and their arc drawn, centre A

PAPER: 5MB3H_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
*8	179 ÷ 70 = 2.5(571.....) 275 ÷ 100 = 2.7(5) 399 ÷150 = 2.6(66....) 70 ÷ 179 = 0.39(11....) 100 ÷ 275 = 0.36(36...) 150 ÷399 = 0.37(59....)	70 m*l* tube with reason	4	**Using pence per m*l*** M1 for a correct method of finding the cost per millilitre (or cost/10 m*l* etc) for one of the sizes M1 for a correct method of finding the cost per millilitre (or cost/10 m*l* etc. must be consistent) for each of the sizes A1 for 2.5(571.....) (70 m*l*) and 2.7(5) (100 m*l*) and 2.6(66....) (150 m*l*) or equivalent depending upon units used. These values can be rounded or truncated as long as they remain different C1 (dep on M1) for selecting the tube with the best value for money based upon a comparison of their 3 values. OR **Using m*l* per 1p** M1 for a correct method of finding the volume per pence (or £) for one of the sizes M1 for a correct method of finding the volume per pence (or £) for each of the sizes, with consistent units A1 for 0.39(11....) (70 m*l*) and 0.36(36...) (100 m*l*) and 0.37(59....) (150 m*l*) or equivalent depending upon units used. These values can be rounded or truncated as long as they remain different C1 (dep on M1) for selecting the tube with the best value for money based upon a comparison of their 3 values.

8			Correct region	3	B1 for full line drawn 1.5 cm from edge of patio and parallel to it B1 for full arc of circle radius 3 cm centre the centre of the pond B1 ft for shading region to the right of their vertical line **and** outside the arc of their circle with correct centre

PAPER: 1MA0_1H

PAPER: 1MA0_2H

Question		Working	Answer	Mark	Notes
15	(a)		7.5	3	M1 for $4.5^2 + 6^2$ (=56.25) M1 for $\sqrt{56.25}$ or $\sqrt{(4.5^2 + 6^2)}$ A1 for 7.5
	(b)		217	4	M1 for use of appropriate trig ratio eg $\tan CAB = \frac{4.5}{6}$ (= 0.75), $\sin CAB = \frac{4.5}{"7.5"}$ (= 0.6), $\cos CAB = \frac{6}{"7.5"}$ (= 0.8) M1 for inverse trig shown correctly eg $CAB = \tan^{-1}\frac{4.5}{6}$ (= 0.75), $CAB = \sin^{-1}\frac{4.5}{"7.5"}$ (= 0.6), $CAB = \cos^{-1}\frac{6}{"7.5"}$ (= 0.8) A1 for 36.8 to 37 (or 53 to 53.2 if identified as ACB) B1ft for bearing 180 + "36.8" if "36.8" is not 40-50 eg 216.8 to 217

9			shaded region	3	B1 for arc of circle centre *A* radius 2 cm B1 for arc of circle centre *B* radius 4 cm B1 ft for correct region shaded

13	(a)		5.0	3	M1 for $2.1^2 + 4.5^2$ or 4.41+20.25 or 24.66 M1 for $\sqrt{(2.1^2 + 4.5^2)}$ or $\sqrt{24.66}$ A1 for answer in the range 4.9 to 5.0
	(b)		115	4	M1 for a correct method to find the angle at the tower (A) or the angle at the tree (B), eg. $\tan(A) = \frac{4.5}{2.1}$ (= 2.14…) or $\tan(B) = \frac{2.1}{4.5}$ (= 0.46…) M1 for $\tan^{-1}\left(\frac{4.5}{2.1}\right)$ (= 64.98..) or $\tan^{-1}\left(\frac{2.1}{4.5}\right)$ (= 25.01…) A1 for 64.9(8...) or 25.0(1...) A1 for 115 or ft 180 – "64.98..." or 90 + "25.01"

Paper: 5MB3H_01

PAPER: 5MB3H_01

Question		Working	Answer	Mark	Notes
5			Region shaded	3	B1 for circle centre f radius 3.5cm B1 for circle centre b radius 6cm B1 for correct region shaded

10			Loci drawn	3	B1 for line parallel to *BC* and 3 cm from *BC* B1 for arc drawn, centre *C*, with radius 4 cm B1 ft for shading a region below their horizontal line **and** inside their arc

PAPER: 1MA0_2H					
Question		**Working**	**Answer**	**Mark**	**Notes**
*11			No supported by working	4	M1 for π × 7 (= 21.9 to 22) or π × 7 × 2.54 = (55.5 to 56) M1 (dep) for a complete method that could lead to two figures that are comparable eg π × 7 × 2.54; π × 7 and 50 ÷ 2.54 A1 for correct comparable figures eg 55.5 to 56 (cm); 21.9 to 22 (in) and 19.6 to 19.7 (in) C1 (dep M2) for a correct conclusion based on their comparable figures OR M1 for eg 50 ÷ π (= 15.9 to 15.92) or 50 ÷ 2.54π (=6.26 to 6.27) M1 (dep) for a complete method that could lead to two figures that are comparable eg (50 ÷ π) ÷ 2.54; 50 ÷ π and 7 × 2.54 A1 for correct comparable figures eg 6.26 to 6.27 (in); 15.9 to 15.92 (cm) and 17.7 to 17.8 (cm) C1 (dep M2) for a correct conclusion based on their comparable figures

13			245	2	M1 for method to identify the angle required, including on a diagram A1 cao

8		Correct position marked	3	M1 for perpendicular bisector of the line AC M1 for arc of circle centre D radius 7cm A1 for correct point
*9		No with comparison of correct figures.	3	M1 for correct method to find frame dimensions 15+5+5 (=25) and 10+5+5 (=20) M1 for finding relationship between length and width for both eg 15 ÷ 10 (=1.5) and 25 ÷ 20 (= 1.25) or for correct use of a scale factor to find a comparable length C1 for correct conclusion following comparison of 2 correct comparable figures

Question	Working	Answer	Mark	Notes
22		6.2	5	M1 for a method to find an angle $RAB = 70$, $ABR = 50$, $BRA = 60$ or $TAR = 20$ M1 for substitution into sine formula $\frac{AR}{\sin"50"} = \frac{12}{\sin"60"}$ M1 for use of sine rule to find AR, $AR = \frac{12}{\sin"60"} \times \sin"50"$ (=10.61) M1 for substitution into cosine formula $TR^2 = 5^2 + "10.61"^2 - 2 \times 5 \times "10.61" \times \cos 20$ (=37.92) A1 for 6.15 - 6.2

11	(a)		150	2	M1 for 180 – (360 – 330) or 180 – 30 or 330 – 180 or a complete diagram showing the bearing of 330° A1 cao
	(b)		11 40	4	M1 for 200 ÷ 120 (=1 2/3 h) M1 for conversion between hours and minutes A1 for 1 h 40 min or 100 minutes B1 (ft dep on M1) for 11 40

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2	(a)		Correct point marked	3	M1 for line bearing 300° M1 for line bearing 40° A1 cao
	(b)		4.15	2	M1 for "8.3" × 50 000 (=415 000) A1 for 4.10 – 4.25
*3			Bottle with reason	5	**Cans** M1 for 30×0.28 – 10×0.25 (=5.9) oe **Bottles** M1 0.15 × 1.60 (=£0.24) oe or 0.15 × 6.40 (=0.96) oe M1 (dep) for 1.60 – 0.24 (=£1.36 per bottle, or £5.44 for 4 bottles) oe **Best value** M1 for "1.36" ÷ 2.5 (=0.544 £/litre) and "5.9" ÷ 9.9 (=0.595…£/litre) oe C1 (dep on M1) for 0.544 and 0.595… and bottle identified OR M1 for 2.5 ÷ "1.36 (=1.83… litres/£) and 9.9 ÷"5.9" (=1.67… litres/£) C1 (dep on M1) for 1.67... and 1.83… and bottle identified

Original question 5

The full source mark scheme begins on page 183. Use the original paper code, tier and question number shown above.

Question	Working	Answer	Mark	Notes
12 (a)		049	1	B1 for answer in range 47 to 51
(b)		12	2	M1 for line drawn on a bearing of 320° ±2° A1 for answer in range 10 to 14

10		C shown	3	M1 for correct angle of 70° M1 for correct angle of 320° A1 C marked unambiguously in the correct position

7		Correct region	3	B1 for perpendicular bisector of the line AB B1 for arc of circle centre B radius 4 cm B1 for shading correct region

Paper: 1MA0/2H

9		Correct position of C	3	M1 for line drawn or point marked on a bearing of 130° from A M1 for line drawn or point marked on a bearing of 245° from B A1 for correct position of C

7	rotation 180° about (−1, −2) **or** enlargement sf −1 centre (−1, −2)	B2 (B1	rotation 180° about (−1, −2) **or** enlargement sf −1 centre (−1, −2) rotation 180° **or** rotation about (−1, −2) **OR** enlargement sf −1 **or** enlargement centre (−1, −2)) Award no marks for the description if more than one transformation is given SC B1 for fully correct diagram if B0 scored	Condone missing brackets but do not accept centre written as a vector Do not accept 'half turn' for 'rotation 180°' Ignore references to clockwise and anticlockwise Triangles at (−3, 1), (−5, 1), (−4, 3) and (−3, −5), (−5, −5), (−4, −7)

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
23	098.6	P1	for using bearings to determine ABC as 67°	Accept 67 written on the diagram.
		P1	for using the cosine rule to find AC eg $(AC^2 =) 9^2 + 8^2 - 2 \times 9 \times 8 \times \cos[67]$ oe or AC = 9.4199…	Accept correct substitution into RHS of equation Accept AC in the range 9.41 to 9.42
		P1	(dep P1) for using the sine rule to find angle BAC eg $\frac{9}{\sin BAC} = \frac{"9.42"}{\sin[67]}$ oe **OR** for using the cosine rule to find angle BAC eg $9^2 =$ "9.42^2" $+ 8^2 - 2 \times$ "9.42" $\times 8 \times \cos BAC$ oe	
		P1	for rearranging eg $\sin BAC = 9 \times \frac{\sin[67]}{"9.42"}$ oe **OR** eg $\cos BAC =$ ("9.42^2" $+ 8^2 - 9^2$) ÷ (2 × "9.42" × 8) oe **OR** for angle BAC = 61.57…	Accept any equivalent form with values substituted
		A1	for angle in the range 98.5 to 98.6	If the correct answer is given without supportive evidence award 0 marks. Condone missing "0" at the front. If an answer within the range is seen in working and rounded incorrectly award full marks.

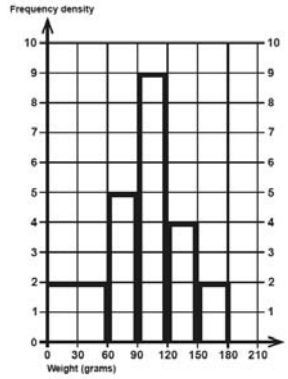
Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 3H

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA1/3H			
Question		**Modification**	**Mark scheme notes**
1		Diagram enlarged. Wording added 'It shows an incomplete Venn diagram.' Ovals made circular. Regions labelled 'Set A' and 'Set B' on the diagram. Braille only – spaces labelled (i) to (iv).	Standard mark scheme
3		Frequency column widened. The first two numbers in the table changed to 8 and 12 In part (b) diagram enlarged. Right axis labelled. Scale changed. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme but the first two points plotted in (b) should be at (15,8) and (25,12)
4		Diagram enlarged. Crosses changed to solid dots. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme
5		Wording added '*ABCDEF*'. Diagram enlarged. Angle moved outside of the angle arc and the angle arc made smaller.	Standard mark scheme

PAPER: 1MA1/3H			
Question		**Modification**	**Mark scheme notes**
6		Diagram enlarged and labelled as Diagram1. Inside the cylinder labelled as 'Tank'. Diagram of the circular face added and labelled as Diagram 2. Wording added 'Diagram 1 shows a tank.' Wording changed to 'Each tank is in the shape of a cylinder with both a top and a bottom as shown in Diagram 2'. Model of Diagram 1 provided for Braille candidates only.	Standard mark scheme
8	(a) (b)	Diagram enlarged and straightened. Diagram enlarged. Solid dot added at C. Excess grid removed. Wording added 'It shows triangles PQR and XYZ on a grid.'	Standard mark scheme
9		Table turned vertical.	Standard mark scheme
14		Diagram enlarged. Wording added: 'AF = BC = 24 cm. Angle FAE = Angle CBD = 30°' Angles moved outside of angle arcs and angle arcs made smaller.	Standard mark scheme
17		Diagrams enlarged. Graph column widened. Braille only – descriptions labelled from (i) to (iv).	Standard mark scheme

PAPER: 1MA1/3H			
Question		**Modification**	**Mark scheme notes**
21		Diagrams enlarged. 120 to 135 group changed to a 120 to 150 group with height 4. 135 to 180 group changed to a 150 to 180 group with height 2.  Axes labels moved above the vertical axis and to the left of the horizontal axis. Right axis labelled. Shading removed. Wording changed to 'Work out the value of the angle marked $x°$'	Standard mark scheme Note (does not change mark scheme): Weight FD f 0-60 2 120 60-90 5 150 90-120 9 270 *120-150 4 120* *150-180 2 60*
22		Diagram enlarged. Cross changed to solid dot. Solid dot added at B. Line OA shown on the diagram. Wording added 'OA is shown on the diagram.' Angle moved outside of the angle arc and the angle arc made smaller.	Standard mark scheme
23		Diagram enlarged. A and C connected with a dashed line. Angles moved outside of angle arcs and angle arcs made smaller.	Standard mark scheme

8	(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.
	(ii)	Bearing in the range 317 to 330	P1	for a process to work out the distance *PQ*, eg. 12 × 1.5 (= 18)	
			P1	(dep previous P1) for the process to use the given scale, eg. "18" ÷ 4 (= 4.5 cm)	Award P3 for Q shown in the correct place on the diagram. 4.5 scores 2 marks provided there is a link to 12 × 1.5 (= 18)
			A1	(dep P3) for distance in the range 20 to 23	Award no marks if no supportive processes
			A1	(dep P3) for bearing in the range 317 to 330	Award no marks if no supportive processes Award A0A0 if *Q* is not in the correct place

Paper: 1MA1/1H

6	327	M1 A1	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 cao	Diagram can be a sketch

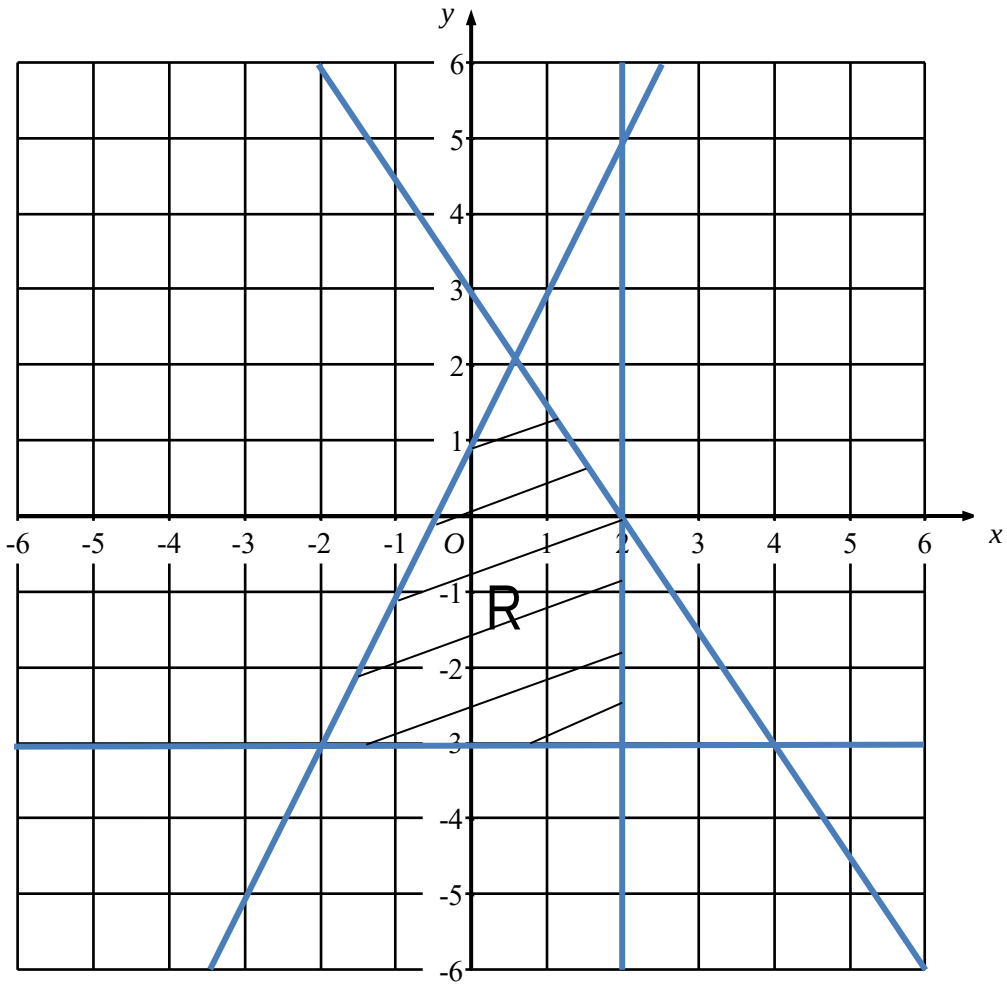
Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
11	12	P1	for process of working with area scale factor, eg area SF = 50^2 (= 2500) or 0.5 × 0.5 (= 0.25) or 48 × 50 × 50 (= 120 000) **or** for process which uses 1 (m^2) = 10 000 (cm^2), eg $\frac{48}{10\,000}$	
		P1	for complete process, eg $\frac{"120\,000"}{100\times100}$ or “0.25” × 48	
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
8	35	P1	for one correct use of the given scale, eg $40 \div 5$ (= 8) **or** 28×5^2 (= 700)	Can award these marks in either order
		P1	for process to use area of triangle, eg $28 = \frac{1}{2} \times PQ \times [QR]$ **or** $[\text{area}] = \frac{1}{2} \times PQ \times 40$	[*QR*] must be clearly identified as the drawing length, and cannot be 40 [area] must be clearly identified as the real area, and cannot be 28
		A1	cao	

Question	Answer	Mark	Mark scheme	Additional guidance
22	Proof	C1 C1 C1 C1	for angle OAP = angle OBP = 90 angle between radius and tangent is 90° for $OA = OB$ both radii OP is common (dep on C3) for a complete proof with all reasons given, eg triangles OAP and OBP are congruent RHS so $AP = BP$ or $AP = \sqrt{OP^2 - OA^2}$ and $BP = \sqrt{OP^2 - OB^2}$ and $OA = OB$ so $AP = BP$	May be seen as 2 separate diagrams All reasons given must be clearly linked to the appropriate statement Underlined words need to be shown
22 **ALT**	Proof	C1 C1 C1 C1	for $\cos AOP = \frac{AO}{OP} = \frac{r}{OP}$ or $\cos BOP = \frac{BO}{OP} = \frac{r}{OP}$ angle between radius and tangent is 90° for $\cos AOP = \frac{AO}{OP} = \frac{r}{OP}$ **and** $\cos BOP = \frac{BO}{OP} = \frac{r}{OP}$ **and** $AOP = BOP$ both radii OP is common (dep on C3) for a complete proof with all reasons given, eg triangles OAP and OBP are congruent SAS so $AP = BP$	May be seen as 2 separate diagrams Underlined words need to be shown

13



Modifications to the mark scheme for Modified Large Print (MLP) papers: 1MA1 2H

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Angles: ±5°
Measurements of length: ±5 mm

PAPER: 1MA1_2H			
Question		**Modification**	**Mark scheme notes**
1		Diagram enlarged. Wording added 'Look at the diagram for Question 1 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram shows a right-angled triangle labelled ABC. In the diagram: AB = 10 cm AC = 19 cm'	Standard mark scheme
2	(b)	Word 'When' added Letters changed: A changed to T and B changed to U	Standard mark scheme
5	(a)	Word 'below' added to the sentence 'Complete the table below of values for …' For Braille: answer lines added Ans: (i) _____ (ii) _____ (iii) _____	Standard mark scheme
	(b)	Diagram enlarged. Wording added 'Look at the diagram for Question 5 (b) in the separate Diagram Booklet. The diagram shows a grid.' For Braille sentence added 'A spare tactile diagram and bumpons are provided for this question.'	Standard mark scheme
7		Diagram enlarged. Labelling of trapezium changed from ABCD to DABC. Top left now A – top right now B – bottom right now C and bottom left now D. Letter changed: x changed to y Wording added 'Look at the diagram for Question 7 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram shows a quadrilateral labelled ABCD. In the diagram: All angles are measured in degrees. Angle ABC = 4y + 8 Angle BCD = 3y – 3 Angle CDA = 2y + 15 Angle DAB = 4y + 15'	Standard mark scheme but note the changes in the vertices and the change from x to y

PAPER: 1MA1_2H			
Question		**Modification**	**Mark scheme notes**
8		Diagram enlarged. Labelling of the triangle changed – Now P at the top, Q same at bottom right, R now at bottom left. Wording added 'Look at the diagram for Question 8 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram shows a playground in the shape of a right-angled triangle labelled PQR.' Wording changed 'The real length of PQ is 40 m. (changed from QR) Work out the real length of RQ.' (changed from PQ)	Standard mark scheme but note the changes in the vertices
10		Diagram enlarged. Letter changed: x changed to y Wording added 'Look at the diagram for Question 10 in the separate Diagram Booklet. The diagram is NOT accurately drawn. The diagram shows two right-angled triangles labelled PQR and STU. In the diagram: All lengths are measured in centimetres. In triangle PQR: PR = 8 cm RQ = (7 – 2y) cm Angle RPQ is marked a In triangle STU: SU = (1 + y) cm UT = 4 cm Angle STU is marked b'	Standard mark scheme but note the change of letter from x to y

PAPER: 1MA1_2H			
Question		**Modification**	**Mark scheme notes**
11		Wording changed 'Look at the frequency table for Question 11 in the separate Diagram Booklet. It gives information about the weights of **60** parcels.' Word 'below' added 'The frequency table below gives…' Frequency values in the table changed from 7, 21, 15, 11, 6 to 5, 25, 15, 10, 5.	B1 for 5, 30, 45, 55, 60
	(b)	Wording changed 'Look at the grid for Question 11 (b) in the separate Diagram Booklet. On the grid, draw a cumulative frequency graph for your table.' For Braille: sentence added 'A spare tactile diagram, bumpons and Wikki Stix are provided for this question.'	Standard mark scheme but points plotted at heights 5, 30, 45, 55, 60
	(c)		M1 for at least one correct quartile, eg (UQ =) 6 or (LQ =) value in the range 2.5 to 3 **or** ft their cf graph A1 for answer in the range 3.4 to 3.8
	(d)	Value changed: 7.4 kg changed to 7 kg	M1 for cf reading at weight = 7 in the range 47 to 53 **or** ft their cf graph A1 for answer in the range 7 to 13
13		Diagram enlarged. Wording added 'Look at the diagram for Question 13 in the separate Diagram Booklet. The diagram shows a coordinate grid.' For Braille: sentence added 'A spare tactile diagram, Wikki Stix, drawing film and sticky label R are available for this question.'	Standard mark scheme
14	(a)	Diagram enlarged. Wording added 'Look at the diagram for Question 14 (a) in the separate Diagram Booklet. The diagram is a graph.' For Braille: sentence added 'A spare tactile diagram, Wikki Stix are available for this question.'	Standard mark scheme
	(b)	For Braille: sentence added 'A spare tactile diagram, Wikki Stix are available for this question.'	Standard mark scheme

PAPER: 1MA1_2H			
Question		**Modification**	**Mark scheme notes**
15		Letter changed: a changed to p	Standard mark scheme but note the change of letter from a to p
16		Letter changed: x changed to y	Standard mark scheme but note the change of letter from x to y
17		Wording changed to 'Look at the diagrams for Question 17 in the separate Diagram Booklet. The diagrams are NOT accurately drawn. The diagrams show three similar solid cylinders made from the same material. The cylinders are labelled cylinder L, cylinder M and cylinder P. You may also be given three models.' For Braille: wording changed to 'Ask for the models for Question 17. The models are NOT accurately made. The models represent three similar solid cylinders made from the same material. The models are labelled Cylinder L, Cylinder M and Cylinder P. Cylinder L has a mass of 64 g. Cylinder M has a mass of 125 g. Cylinder M has a total surface area of 144 cm^2 Cylinder P has a total surface area of 16 cm^2'	Standard mark scheme
19		Diagram enlarged. Wording added 'Look at the diagram for Question 19 in the separate Diagram Booklet. The diagram is NOT accurate. The diagram shows a quadrilateral labelled OACB. In the diagram:'	Standard mark scheme
21		Diagram enlarged. Sentence added 'Look at the diagram for Question 21 in the separate Diagram Booklet.' For Braille: sentence added 'A spare tactile diagram, Wikki Stix and drawing film are available for this question.'	Standard mark scheme
22		Diagram enlarged. Sentence added 'Look at the diagram for Question 22 in the separate Diagram Booklet. The diagram is NOT accurately drawn. In the diagram:'	Standard mark scheme

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Mathematics A 1387

Summer 2005
Mark scheme

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Mathematics A 1387

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NOTES ON MARKING PRINCIPLES

1 Types of mark

- M marks: method marks
- A marks: accuracy marks
- B marks: unconditional accuracy marks (independent of M marks)

2 Abbreviations

cao – correct answer only
ft – follow through
isw – ignore subsequent working
SC: special case
oe – or equivalent (and appropriate)
dep – dependent
indep - independent

3 No working

If no working is shown then correct answers normally score full marks
If no working is shown then incorrect (even though nearly correct) answers score no marks.

4 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.
If there is no answer on the answer line then check the working for an obvious answer.

5 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

6 **Ignoring subsequent work**
It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

7 **Probability**
Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

8 **Linear equations**
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

9 **Parts of questions**
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

Paper 5521/01					
No		Working	Answer	Mark	Notes
1	(a)		17252	1	B1 cao
	(b)		5400	1	B1 cao
	(c)		thousands, 1000, 4000	1	B1
2	(a)		grams, g	3	B1 oe spelling
			centimetres, cm		B1 oe spelling
			millilitres, m*l*, cm^3		B1 oe spelling
	(b)		5	1	B1 cao
3	(a)		106, 102	1	B1 cao ignore extras
	(b)		eg take away 4	1	B1 could be indicated on the diagram
	(c)		46	1	B1 cao

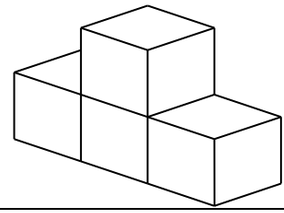
Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
4		286 × 43 = 858, 11440, 12298 43 × 286 = 258, 3440, 8600, 12298 286×40 = 1140 286×3 = 858 1140+858=12298 x | 40 | 3 | 200 | 8000 | 600 | 8600 80 | 3200 | 240 | 3440 6 | 240 | 18 | 258 | | | 12298 2 8 6 1 | 0 8 | 3 2 | 2 4 | 4 2 | 0 6 | 2 4 | 1 8 | 3 2 9 8	12298	3	M2 for complete correct method (condone one computational error) (M1 for complete correct method with two computational errors) A1 cao OR B2 inside of grid completed (condone missing zeros and one error) (B1 2 or 3 errors) B1 cao
5	(a) (b)(i) (ii) (c) (d)(i) (ii) (iii)		18, 69 18 or 36 16 or 36 factor 18 11 or 88 69	1 1 1 1 3	B1 B1 B1 B1 B1 cao B1 B1 cao

Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		April & May	1	B1 for both
	(b)		Daffodil	1	B1
	(c)		Feb	1	B1
	(d)		Crocus	1	B1
	(e)(i)		$\frac{1}{5}$	2	B1 for $\frac{1}{5}$ oe
	(ii)		× from 56 mm to 64 mm from 0		B1 A single mark on the line, between 56 mm and 64 mm measured from end 0
7	(a)	$\frac{40}{100}$	$\frac{2}{5}$	2	B2 for $\frac{2}{5}$ B1 for $\frac{40}{100}$ or $\frac{4}{10}$ or $\frac{20}{50}$ or $\frac{8}{20}$
	(b)		0.98	1	B1 cao
	(c)		7 500 000	1	B1 cao
	(d)		25	1	B1 cao
	(e)		60	1	B1 cao

Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
8	(a)(i)		(0, 2)	2	B1 cao
	(ii)		(4, 1)		B1 cao
	(b)		$(2, 1\frac{1}{2})$ marked	1	B1 Allow 2mm tolerance from $(2, 1\frac{1}{2})$
9	(a)		2.40	1	B1 cao could be indicated on the diagram
	(b)	1.60 + 0.40	2.00	2	M1 for appropriate sum or product in £ or p or 200 seen eg 1.60 + 0.40, 160 + 40, 0.80 + 0.80 + 0.40, 80 + 80 + 40, 0.08×25, 0.80×2.5, 200 A1 cao
	(c)	$1\div0.8$ or $2.50\div2$	1.25	2	M1 for $1.00\div0.8$ or $2.50\div2$ or 125 or appropriate combination eg $1+\frac{1}{2}\times0.50$ A1 cao
10	(a)		hexagon	1	B1 Condone spelling error
	(b)		Sum of angles at a point is 360°	2	B1 for 360 seen B1 for "point", "complete turn" or "a circle" or similar unless accompanied by an incorrect angle SC If neither B1 scored, award B1 for a clear indication that the size of an angle, other than *x*, is 90° or a right angle (may be on diagram)
	(c)	$30\times4+8\times2$	136	2	M1 $30\times4+8\times2$ or attempt to sum 5 or 6 lengths A1 cao

Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
11	(a)		13, 67, 76, 103, 130	5	B1 cao
	(b)		$-7, -3, -1, 0, 5$		B1 cao
	(c)		0.07, 0.072,0.7, 0.702, 0.72		B1 cao
	(d)		0.6, $\frac{2}{3}$, 70%, $\frac{3}{4}$		B2 (B1 for any 3 in correct order)
12	(a)		16 30	1	B1 Accept 4 30 pm Do not accept 4 30
	(b)(i)	$33.56 \div 4$ oe	8.39	3	M1 for $33.56 \div 4$ oe eg 3356 ÷ 4, division by 2 twice A1 cao
	(ii)		9		B1 ft from "8.39" unless whole number of pounds
13	(a)		6 cm^2	3	B2 for 6 cao for numerical answer (B1 for $5.5 < \text{Area} \leq 7$) then B1 (indep) for cm^2 with or without numerical answer
	(b)	See diagram	Correct shape	2	B2 (B1 for any 2 sides correct or a correct enlargement scale factor $\neq 1$ or 2)

Paper 5521/01				
No	**Working**	**Answer**	**Mark**	**Notes**
14 (a)	$(4+3)\times10$	70	2	M1 for (4 + 3) × 10 A1 cao
(b)	$120\div10-3$	9	2	M1 for $\frac{120}{10}$ or 12 seen eg $12\times10=120$ A1 cao
(c)		$C=10(n+3)$	3	B3 for $C=10(n+3)$ oe such as $C=(n+3)\times10$ (B2 for correct RHS or $C=n+3\times10$, $C=10n+3$ oe B1 for C = some other linear expression in n or for $n+3\times10$, $10n+3$ etc) Note: $C = n$ scores no marks
15		11 13 16 8 21	2	B2 all correct (B1 for 2 correct)

Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
16	(a)		$2p + 4q$	2	B2 for $2p + 4q$ (accept $2 \times p$ etc) (B1 for $2p$ or $4q$)
	(b)		$2y^2$	1	B1 accept $2 \times y^2$ oe inc $2 \times y \times y$
	(c)		$3c + 4d$	2	B2 for $3c + 4d$ (accept $3 \times c$ etc) (B1 for $3c$ or $4d$)
	(d)		$8pq$	1	B1 accept in any order but must not include $\times$ sign
17	(a)(i)		60	2	B1 cao
	(ii)		eg top triangle is equilateral		B1 for reason
	(b)		150	2	M1 for $\frac{180-"60"}{2} + 90$ A1 ft from (a)(i) if $x < 90$ SC B1 for "60" + 90 if $x < 90$
18			40	2	M1 for 60×2 or 120 or $60 \div 3$ or 20 or $\frac{120}{180}$ A1 cao
19			correct drawing	2	B2 Condone hidden detail shown with solid lines and missing lines on front face (B1 for a correct sketch with other incorrect sketch(es) or for prism with correct cross section >1 cube wide or for attempt to draw prism with correct cross section or prism with correct plan and side elevation)

Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
20		$\frac{600}{3\times10}$ or $\frac{640}{3.2\times10}$	$20\text{-}21\frac{1}{3}$	2	M1 for rounding at least two of the numbers to 1 sf or for sight of 640, 3.2 or 640, 32 or 600, 32 or 30 seen A1 for $20\text{-}21\frac{1}{3}$ Note: 20.3125 scores M0 A0
21	(a)		Points plotted	1	B1 $\pm$ 1 full (2 mm) square
	(b)		positive	1	B1 cao
	(c)		Line of best fit	1	B1 Must pass through (42.5, 1.45), (42.5, 1.55) AND (67.5, 1.75), (67.5, 1.85)
	(d)		~ 1.65	1	B1 ft from single line segment with positive gradient $\pm$ 1 full (2 mm) square
22	(a)	eg $50\times\frac{2000}{500}$	200	2	M1 for $\frac{2000}{500}$ or 4 seen A1 cao
	(b)	eg $400\times\frac{750}{500}$	600	2	M1 for $\frac{750}{500}$ or 1.5 seen or 400 + 200 A1 cao

Paper 5521/01					
No		**Working**	**Answer**	**Mark**	**Notes**
23	(a)	$4\times3-2\times1$ $12-2$	10	3	M1 for 3×4 (=12) or 1×2 or attempt to divide diagram up into rectangles M1 "12"– "2" or sum of areas of rectangles A1 cao
	(b)(i)	$\frac{10}{100}\times680$ or $680\div10$ 680 + 68	748	5	M1 $\frac{10}{100}\times680$ or 680÷10 or 68 seen M1 (dep) 680 + "68" or M2 for 680×1.10 A1 cao
	(ii)	"748"÷50 or 14.96	15		M1 For "748"÷50 or 14.96 Accept "748" rounded up or down to next 50 followed by $\div50$ A1 ft from (b)(i) rounded up SC B1 for 680 (seen) leading to 14

Paper 5521/02					
No		**Working**	**Answer**	**Mark**	**Notes**
1	(a)	Plain llll lll 8 Chicken lll 3 Bovril llll 5 S & Vin llll 4		3	M1 for attempt to tally A1 for 1 frequency correct or all tallies correct A1 for all frequencies correct (accept for /20)
	(b)		4	1	B1 ft
	(c)		Plain or 8	1	B1 ft
2	(a)(i)		11	2	B1 cao
	(ii)		16		B1 cao
	(b)	See diagram	Correct lines	2	B2 cao for both lines correct (B1 for one line correct)
	(c)		12	2	B2 cao (B1 for 11 or 13)
3	(a)		580	1	B1 for 580 (± 2) could be written on line
	(b)		7.2	1	B1 for 7.2 ± 0.02 could be written on line
	(c)		Arrow at 48	1	B1 allow ± half graduation
	(d)		Arrow at 6.7	1	B1 allow ± half graduation
4	(i)		Cylinder	2	B1 ignore spelling
	(ii)		Cuboid		B1 ignore spelling
5	(a)	£10 – (£2.15 + £2.30)	5.55	4	M1 £2.15 + £2.30 A1 for 4.45 M1 £10 – "4.45" A1 cao
	(b)	£60 ÷ £2.80 = 21.42857	21	2	M1 for £60 ÷ 2.80 or sight of digits 214… A1 for 21
	(c)	$120 \times 25 \div 100$	30	2	M1 ¼ of £120 (oe) A1 cao SC B2 for £90

Paper 5521/02					
No		Working	Answer	Mark	Notes
6	(a)(i)		143^0	2	B1 for 143 ($\pm 2^0$)
	(ii)		Obtuse		B1 for obtuse (ignore spelling)
	(b)	See diagram	Accurate drawing	1	B1 for accurate drawing ± 2mm
7	(a)(i)		5	2	B1 cao
	(ii)		23		B1 cao
	(b)	× 2 – 1		1	B1 for explaining a suitable method
	(c)	See their diagram		1	B1 for a correct diagram
	(d)		14, 17	2	B2 cao for both (B1 for one only ft from their 14)
8	(a)		90	1	B1 accept –90
	(b)		540	1	B1 accept –540
	(c)		Jupiter	1	B1 accept –150
	(d)		- 230	1	B1 cao

Paper 5521/02					
No		Working	Answer	Mark	Notes
9	(a)	2658 – 2430 = 228 "228" × 32	72.96	4	M1 2658 – 2430 A1 228 M1 "228" × 32 or "228" × 0.32 or digits 7296 seen A1 cao **Or** M1 for 2430 × 32 (or digits 77760 seen) or 2658 × 32 (or digits 85056 seen) A1 if 1 correct M1 for "85056" – "77760" or 7296 seen A1 cao
	(b)	$\frac{2}{5} \times 145 = 58$ 145 – "58"	87	3	M1 $\frac{2}{5} \times 145$ (or M1 $\frac{3}{5}$ seen) A1 58 (or M1 $\frac{3}{5} \times 145$) A1 for 87 ft
	(c)(i) (ii)		80 125	2	B1 for 80 (± 1) B1 125 (± 3)

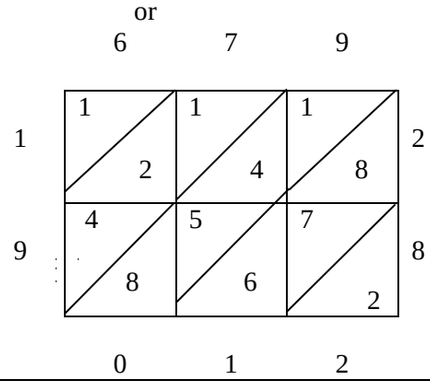
Paper 5521/02					
No		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		1.5 – 2.0	1	B1 for height between 1.5m – 2.0m inclusive
	(b)	Height of man × "2.5"	3 – 6	3	B3 for height between 3m – 6m inclusive (B2 for multiplying (a) by a number between 2 and 3 inclusive) (B1 for multiplying (a) by a number)
11		61 – 19 = 42 42 ÷ 3 = 14	14	2	M1 for – 19 or 42 seen A1 cao
12	(a)		5	1	B1
	(b)	4+5+5+5+4+3+2+1+4+5 = 38 mean = 38 ÷ 10 = 3.8	3.8	2	M1 for attempt to add and ÷ 10 or 3.7 or 3.9 seen A1 for 3.8 SC B1 for 33.5 seen
13	(a)		$3x$	1	B1 cao Accept $3 \times x$, $x3$, $x \times 3$, $x + x + x$
	(b)		x - 9	1	B1 for x – 9 cao
14	(a)	14.44 – 8.660254038	5.77974(…)	2	M1 for 14.44 seen or 8.66(…) or 5.7 or 5.8 or better rounded or truncated
	(b)		6	1	A1 cao B1 ft
15		15 ÷ 24	62.5	2	M1 for 15 ÷ 24 or 1500 ÷ 24 or sight of digits 625 A1 cao
16		2.10 × 450	945	2	M1 for digits 210 × 450 or sight of digits 945 A1 cao
17		See diagram	$2(y + y)$ $2y + 2y$	2	B1 for $2(y + y)$ B1 for $2y + 2y$ (Deduct B1 for each additional tick (>2) to min 0)
18		360° ÷ 18 (=20) Sector angles: G= 60; S= 80; B=220; Correct sectors labelled correctly Use angle measurer	Angles drawn, labelled	4	B4 for fully correct and labelled pie chart (B3 for all angles correct or for a labelled pie chart with 2 correct angles) (B2 for labelled pie chart with 1 correct angle drawn) (B1 for 360° ÷ 18 or 20 seen or implied)

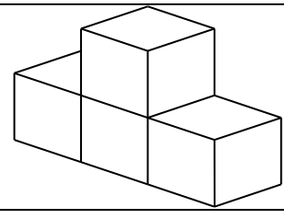
Paper 5521/02					
No		Working	Answer	Mark	Notes
19	(a)		Correct plane	2	B2 for a correct plane defined by showing at least 2 lines. (B1 for a line of symmetry on one face)
	(b)		Correct net	2	B2 cao (B1 for 2 equilateral triangles joined appropriately to at least one rectangle or for 1 equilateral triangle joined appropriately to one of 3 rectangles)
	(c)		Correct drawing	2	B1 for two extra sides of length 6cm (± 2mm) B1 for construction arcs 6cm from each of the ends of the given line.
20	(a)		15	1	B1 for 15 (± 1)
	(b)		15	1	B1 for 15 (± 0.4)
	(c)			2	B1 horiz. line from (2, 20) to (3, 20) B1 line from (3, 20) to (5,0) or horizontal translation of it SC B1 for any journey ending at (5,0)
21	(a)	$x+4+x+x+4+x$	$4x+8$	2	M1 for attempting to add x, $x + 4$, x, $x + 4$ may be implied by $4x + a$ ($a > 0$) A1 for $4x + 8$ or $4(x + 2)$
	(b)	$4x + 8 = 54$ $4x = 46$ $x = 11.5$ Length = "11.5" + 4	15.5	3	M1 for "$4x + 8$" = 54 A1 cao for 11.5 seen B1 ft for "11.5" + 4
22		0.4 + 0.15 1 – "0.55"	0.45	2	M1 for 1 – sum A1 for 0.45 o.e. SC B1 for 0.81
23	(a)		3:1	1	B1 cao
	(b)	$\pi \times 2.45$	7.7	2	M1 for $\pi \times 2.45$ (accept π as 3.1 or better) A1 for 7.59 to 7.70

Paper 5521/02					
No		**Working**	**Answer**	**Mark**	**Notes**
24		7×10000	70 000	2	M1 for 7 X 10 000 or 7 X 100 X 100 A1 cao
25		5.40 ÷ 3 × 7	12.60	3	M1 for 5.40 ÷ 3 or sight of 1.8 M1 dep for "1.80" × 7 A1 for 12.6 or equivalent
26		7.60 x $\frac{17.5}{100}$ = 1.33 7.60 + 1.33 = 8.93 1650 x "8.93"	£14 734.50	4	M1 for 7.60 x $\frac{17.5}{100}$ or 1.33 seen or 7.60 x 1.175 (oe) (Award M1 for 10%, 5% and 2½% correctly calculated) A1 for 8.93 or 893 M1 for 1650 x "8.93" or digits 147345 seen A1 cao Accept 14734.5 **Alternative** M1 for 1650 × 7.6(0) or 12540 seen M1 for "12540" × $\frac{17.5}{100}$ or 2194.5 seen or "12540"× 1.175 (oe) (Award M1 for 10%, 5% and 2½% correctly calculated) M1 for "12540" + "2194.5" (dep on both previous method marks) or digits 147345 seen A1 cao accept 14 734.5

Paper 5523/03				
No	**Working**	**Answer**	**Mark**	**Notes**
1		Correct shape	2	B2 B1 for any 2 sides correct, or a correct enlargement scale factor ≠1 or 2.
2 (a)		11 13 16 8 21	2	B2 all correct (B1 for 2 correct) sign
(b)		$\frac{31}{80}$	1	B1 oe
3 (a)		$2p+3q$	2	B2 for $2p+3q$ (accept $2\times p$ etc) (B1 for $2p$ or $3q$ or $2p3q$)
(b)		$2y^2$	1	B1 accept $2\times y^2$ or $2\times y\times y$
(c)		$3c+4d$	2	B2 for $3c+4d$ (accept $3\times c$ etc) (B1 for $3c$ or $4d$ or $3c4d$)
(d)		$8pq$	1	B1 accept in any order but must not include ×
4 (a)(i)		60	2	B1 cao
(ii)		eg top triangle is equilateral		B1 for reason
(b)		150	2	M1 $\frac{(180-"60")}{2}+90$ A1 ft from (a)(i) if $x < 90°$ SC:B1 for answer from "60" + 90 if $x < 90°$

Paper 5523/03					
No		**Working**	**Answer**	**Mark**	**Notes**
5	(a)	$4\times3-2\times1$ $12-2$	10	3	M1 for 3×4 (=12) or 1×2 or attempt to divide diagram up into rectangles M1 "12" – "2" A1 cao
	(b)(i)	$\frac{10}{100}\times680$ or $680\div10$ 680 + 68	748	5	M1 $\frac{10}{100}\times680$ or $680\div10$ or 68 seen M1 (dep) 680 +"68" (or M2 for 680×1.10) A1 cao
	(ii)	"748" ÷ 50 or 14.96	15		M1 for "748" $\div50$ or 14.96; accept "748" rounded up or down to next 50 followed by $\div50$ A1 ft from (b)(i) rounded up SC B1 for 680 (seen) leading to 14
6	(a)	$2\times5+5\times-3=10-15=$	-5	2	M1 substitute e.g 2×5 and 5×-3 or 10 and -15 A1 cao
	(b)	5×4^2 - 7 5×16 - 7	73	3	M1 substitution e.g 5×4^2 -7; do not accept 54^2-7 M1 $5\times16-7$ or $5\times4\times4$-7 or 80 – 7 (NB 4^2 as 4×4) A1 cao

Paper 5523/03					
No		**Working**	**Answer**	**Mark**	**Notes**
7		679 × 28 = 5432 + 13580 = 19012 or 28 × 679 = 252 + 1960 + 16800 = 19012 or  	190.12	3	M1 for an attempt to multiply the units and tens, or correct partitioning M1 complete correct method (condone one arithmetic error) A1 for 190.12 cao OR M1 for putting the numbers in a grid M1 for multiplying out and addition (condone one error) A1 answer shown with point OR M1 for correct partitioning M1 679×20 and 679×8 calculated oe (condone one error) A1 cao
8	(a)		Points plotted	1	B1 ±1 full (2mm) square
	(b)		positive	1	B1 cao
	(c)		Line of best fit	1	B1 must pass through (42.5, 1.45), (42.5, 1.55) AND (67.5, 1.75), (67.5, 1.85)
	(d)		approx 1.65	1	B1 ft from single line segment with positive gradient ± 1 full (2mm) square

Paper 5523/03					
No		**Working**	**Answer**	**Mark**	**Notes**
9	(a)	eg $50 \times \frac{2000}{500}$	200	2	M1 $2000 \div 500$ or 4 seen A1 cao
	(b)	eg $400 \times \frac{750}{500}$	600	2	M1 $750 \div 500$ or 1.5 seen or 400 + 200 A1 cao
10			$C = 10(n+3)$	3	B3 for $C = 10(n+3)$ oe such as $C = (n+3) \times 10$ (B2 for correct RHS or $C = n + 3 \times 10$, $C = 10n + 3$ etc B1 for C = some other linear expression in n or $n + 3 \times 10$, $10n + 3$ etc) NB: C=n scores no marks
11	(a)		$p(p+6)$	2	B2 for $p(p+6)$ or $p \times (p+6)$ (B1 for $p(ap+b)$ where a,b are numbers or $p+6$ seen on it's own, or part of an expression)
	(b)	$x^2 - 4x + 7x - 28$	$x^2 + 3x - 28$	2	M1 for 4 terms correct ignoring signs (e.g $x^2, 4x, 7x, 28$) or 3 terms with correct signs (e.g $x^2, -4x, 7x, -28$) A1 cao
12			correct drawing	2	B2. Condone hidden detail shown with solid lines, or missing lines on front face. (B1 for : one sketch correct with other sketches incorrect cross-section correct with depth > 1 cube, correct plan and side elevation)

Paper 5523/03					
No		**Working**	**Answer**	**Mark**	**Notes**
13		$\frac{600}{3\times10}$ or $\frac{640}{3.2\times10}$	20 to 21 $\frac{1}{3}$	2	M1 For rounding at least two of the numbers to 1 sf, or for sight of 640, 3.2 or 640, 32 or 600, 32 or 30 seen A1 for 20 to 21 $\frac{1}{3}$ NB: 20.3125 scores M0 A0
14	(a)		correct reflection	2	B2 (B1 reflection in line other than x=3)
	(b)		reflection in $y = x$	2	B2 cao Accept the word "reflected" (B1 any statement including the word "reflection")
15	(a)(i)		5^6	1	B1 accept 15125, 5^{4+2}
	(ii)		5^3	1	B1 accept 125, 5^{9-6}
	(b)	$x + y = 10$ and $x - y = 4$	$x = 7$ $y = 3$	3	M1 for either $x + y = 10$ or $x - y = 4$ A2 for both values correct [(A1 for one value correct) If M0, award B3 for both values correct or B2 for one value correct, otherwise B0] SC B2 for $x = 3$ and $y = 7$

Paper 5523/03				
No	**Working**	**Answer**	**Mark**	**Notes**
16 (a)	$5-3x=2x+2$ $5-2=2x+3x$	$\frac{3}{5}$	3	B1 for $2x+2$ seen OR $2.5-1.5x=x+1$ M1 for correct rearrangement of 4 terms A1 for $\frac{3}{5}$ oe
(b)		$-3,-2,-1,0,1,2$	2	B2 (B1 for 5 correct and not more than one incorrect integers)
17		question + response boxes oe	2	1st aspect: One question with time period (eg each night); ignore other questions. 2nd aspect: Response list (at least two), not overlapping.* 3rd aspect: Some mention of units (eg hours) in either question or responses Award B2 for all three aspects, or B1 for just two aspects. * 0-1, 2-3, 4-5 is OK, but 0-1, 1-2, 2-3 is not OK.

Paper 5523/03					
No		**Working**	**Answer**	**Mark**	**Notes**
18	(a)	$\frac{2}{3}\times\frac{3}{4}=\frac{6}{12}$	$\frac{1}{2}$	2	M1 for $\frac{6}{12}$ or $\frac{3}{6}$ or $\frac{2\times3}{3\times4}$ A1 accept 0.5
	(b)	$1+2+\frac{8}{12}+\frac{9}{12}$	$4\frac{5}{12}$	3	M1 for attempt to convert to fractions with common denominator e.g two fractions, denominator of 12 A1 correct conversion : $\frac{8}{12}$ and $\frac{9}{12}$, or $\frac{20}{12}$ and $\frac{33}{12}$ seen (oe) A1 cao for $4\frac{5}{12}$ OR attempts to convert to decimals: must use at least 2dp M1 0.66+0.75 (or 1.66+2.75) or 0.67+0.75 etc A1 4.41, 4.417, 4.416 A1 4.416 (*recurring*)
19		$2\times\frac{1}{2}\times6\times8$ or 48 $8\times9+6\times9+10\times9$ or 72 +54 + 90	264 cm^2	4	M1 attempt to find the area of one face; $\frac{1}{2}\times6\times8$ or (8×9) or (6×9) or (10×9) or 72 or 54 or 90 or 24 M1 all five faces with an intention to add A1 cao numerical answer of 264 B1 (indep) cm^2 with or without numerical answer

Paper 5523/03					
No		**Working**	**Answer**	**Mark**	**Notes**
20			$\frac{\pi ab^3}{3d}$ $3(c+d)^3$ $3\pi bc^2$	3	B3 (B1 for each one correct) Nb –B1 for each of the 4th,5th,6th tick
21	(a)	$x+0.3+0.2+x=1$	0.25	2	M1 for $x+0.3+0.2+x=1$ oe, or $0.5\div 2$ A1 oe
	(b)	0.3×200	60	2	M1 0.3×200 A1 cao Accept 60 out of 200 (in words) SC B1 for $\frac{60}{200}$
22	(a)		$(-12)-4\quad -2\quad (0)8$	3	B3 for all correct [(B1 for each one correct)
	(b)		points plotted accurately points joined with smooth curve	2	B1 ± 1 full (2mm) square ft table if at least B1 awarded (all 5 points plotted) B1 ft for any smooth curve if previous B1 gained NB: curve must pass within 1 full square of the points
23			$\frac{1}{4}$ on LH branch $\frac{2}{3}$ & $\frac{1}{3}$ & $\frac{2}{3}$ on RH branches	2	B1 B1
24			m=3 n=5	2	B1 for 3 B1 for 5 (B2 for $2^3\times 5$ or $2\times 2\times 2\times 5$) SC: award B1 only if m=5, n=3 or for 8×5 seen

Paper 5523/03					
No		Working	Answer	Mark	Notes
25		$\frac{5--1}{-1-2} = -2$	$y = -2x + 5$	4	M1 for clear attempt to find gradient eg fraction with -1,5 in numerator, 2,-1 in denominator A1 for -2 B2 ft for $y =$"-2"$x + 5$ oe (eg $y = \frac{-6}{3}x + 5$) (B1 for $y = mx + 5$ or , $-2x+5$ or $y =$"-2"$x + c$)
26	(a)(i)		150	2	B1 accept 150 or 210
	(ii)				B1 for angle at the centre is twice the angle at the circumference
	(b)		30	3	B1 identifies angle between radius and tangent as $90°$ (may be in working or on diagram) M1 $360° - 90 - 90 -$"150" A1 ft from (a)(i) excluding a negative answer OR B1 for 90 M1 for $2 \times (180 - 90 -$"$\frac{150}{2}$"$)$ A1 ft from (a)(i) excluding a negative answer OR B3 for $180 -$(a)
		$360 - 90 - 90 -$"150"			

Paper 5523/04					
No		Working	Answer	Mark	Notes
1	(a)	14.44 – 8.660254038	5.77974(….)	2	M1 for 14.44 seen or 8.66(……) seen or 5.7 or 5.8 or better, rounded or truncated A1 cao
	(b)		6	1	B1 ft
2		15 ÷ 24	62.5	2	M1 for 15 ÷ 24 or 1500 ÷ 24 or sight of digits 625 A1 cao
3	(a)	2.10 × 450	945	2	M1 for digits 210 × 450 or sight of digits 945 A1 cao
	(b)	63÷2.10	30	2	M1 for 63 ÷ digits 210 A1 cao
4		See diagram	2(y + y) 2y + 2y	2	B1 for 2(y + y) B1 for 2y + 2y (Deduct B1 for each additional tick (>2) to min 0)
5		360° ÷ 18 (=20) Sector angles: G= 60; S= 80; B=220; Correct sectors labelled correctly Use angle measurer	Angles drawn, labelled	4	B4 for fully correct and labelled pie chart (B3 for all angles correct or for a labelled pie chart with two angles correct) (B2 for labelled pie chart with one correct angle drawn) (B1 for 360÷18 or 20 seen or implied)
6	(a)		Correct plane	2	B2 for a correct plane defined by showing at least 2 lines. (B1 for a line of symmetry on one face)
	(b)		Correct net	2	B2 cao (B1 for 2 equilateral triangles joined appropriately to at least one rectangle or for 1 equilateral triangle joined appropriately to one of the three rectangles)
	(c)		Correct drawing	2	B1 for two extra sides of length 6 cm (± 2mm) B1 for construction arcs 6cm from each of the ends of the given line
7		61 – 19 = 42 42 ÷ 3 = 14	14	2	M1 for –19 or 42 seen or 3x + 19 A1 cao

Paper 5523/04					
No		Working	Answer	Mark	Notes
8	(a) (b) (c)		15 15	1 1 2	B1 cao for $15(\pm 1)$ B1 cao for $15(\pm 0.4)$ B1 horiz. line from (2,20) to (3,20) B1 line from (3,20) to (5,0) or horiz. translation of it SC: B1 for any journey ending at (5,0)
9	(a)	$x+4+x+x+4+x$	$4x+8$	2	M1 for attempting to add $x+4, x, x+4, x$ may be implied by $4x+a$, $a>0$ A1 for $4x+8$ or $4(x+2)$
	(b)	$4x + 8 = 54$ $4x = 46$ $x = 11.5$ Length = "11.5" + 4	15.5	3	M1 for "$4x + 8$" = 54 A1 cao for 11.5 seen B1 ft for "11.5"+ 4
10		0.4 + 0.15 1 – 0.55	0.45	2	M1 for 1 – sum A1 for 0.45 oe SC: B1 for 0.81
11	(a) (b)	 $\pi \times 2.45$	3:1 7.7	1 2	B1 cao M1 for $\pi \times 2.45$ (accept π as 3.1 or better) A1 for 7.59 to 7.70
12		7×10000	70000	2	M1 for 7×10000 or $7 \times 100 \times 100$ A1 cao
13		$5.40 \div 3 \times 7$	12.60	3	M1 for $5.40 \div 3$ or sight of 1.8 M1 (dep) for "1.80" × 7 A1 for 12.6 or equivalent

Paper 5523/04				
No	**Working**	**Answer**	**Mark**	**Notes**
14	$7.60 \times \frac{17.5}{100} = 1.33$ 7.60 + 1.33 = 8.93 1650 × "8.93"	£14734.50	4	M1 for $7.60 \times \frac{17.5}{100}$ or 1.33 seen or 7.60×1.175 (oe) (Award M1 for 10%, 5% and 2½% correctly calculated) A1 for 8.93 or 893 M1 for 1650 × "8.93" or digits 147345 seen A1 cao Accept 14734.5 OR M1 for 1650×7.6 or 12540 seen M1 for "12540" $\times \frac{17.5}{100}$ or 2194.5 seen or "12540" $\times 1.175$ (oe) (Award M1 for 10%, 5%, and 2½% correctly calculated) M1 for "12540" + "2194.5" (dep on both previous M marks) or digits 147345 seen A1 cao accept 14734.5

Paper 5523/04					
No		**Working**	**Answer**	**Mark**	**Notes**
15		$285 \times 1000/(60 \times 60) = 79.1\dot{6}$		3	M2 for $285 \times 1000 \div 60 \div 60$ or $80 \times 60 \times 60 \div 1000$ or for a correct method to obtain two comparable values e.g $80 \times 60 \times 60$ and 285×1000 (M1 for $285 \div 60 \div 60$ or 0.079(….) seen or $80 \times 60 \times 60$ or 288000 seen or for 285×1000 or 285000 seen or $80 \div 1000$ or 0.08 seen) A1 for 288 or 79.(….) or for two correctly calculated comparable values e.g 288000 and 285000
16	(a)	$4x + 12 = 6$ $4x = -6$	-1.5	3	B1 for $4x + 12$ or $x + 3 = \frac{6}{4}$ M1 for a correct re-arrangement of their 3 terms to isolate $4x$ or x A1 for -1.5 oe
	(b)	$v - u = 5t$	$\frac{v-u}{5}$	2	M1 for isolating $\pm 5t$ or $\pm t$ or for dividing through by 5 A1 oe

Paper 5523/04					
No		**Working**	**Answer**	**Mark**	**Notes**
17		3→15 4→48 3.1→17.3(91) 3.2→19.9(68) 3.3→22.7(37) 3.4→25.7(04) 3.5→28.8(75) 3.4→25.7(04) 3.3→22.7(37) 3.35→24.1(95375)	3.3	4	B2 for trial between 3.3 and 3.4 inclusive (B1 for trial between 3 and 4 inclusive) B1 for different trial between 3.3 and 3.4 exclusive B1 (dep on at least one previous B1) for 3.3 NB trials should be evaluated to at least 1 dp truncated or rounded
18	(a)	36 ÷ (7+3+2) "3" × 7	21	3	M1 for 36 ÷ (7+3+2) M1 (dep) for "3" × 7 or 3 or 2 A1 cao
	(b)	$51.5 \times \frac{8.5}{100} = 4.3775$ 51.5 – 4.3775 = 47.1225	47 or 47.1 or 47.12	4	M1 for $51.5 \times \frac{8.5}{100}$ or 4.37(75) seen M1 (dep) for 51.5 – "4.37(75)" A1 for 47 or better B1 (indep) for rounding their answer correctly to the nearest whole number or 1 or 2 d.p OR M1 for $51.5 \times \frac{100-8.5}{100}$ M1 for $51.5 \times$"0.915" or 0.515 × "91.5" A1 for 47 or better B1 (indep) for rounding their answer correct to the nearest whole number or 1 or 2 d.p

Paper 5523/04					
No		**Working**	**Answer**	**Mark**	**Notes**
19	(a)		Angle in a semicircle	1	B1 oe
	(b)	$12^2 + 16^2 = 400$ $\sqrt{400} = 20$	20	3	M1 for $12^2 + 16^2$ M1 for $\sqrt{144+256}$ A1 cao
	(c)	$\pi \times 10^2$	314	3	M1 for $\pi \times \left(\frac{"20"}{2}\right)^2$ M1 (indep) for correct order of evaluation of $\pi \times r^2$ for any r A1 for 314 – 315 inclusive

Paper 5523/04					
No		Working	Answer	Mark	Notes
20	(a)	$(1 \times 10)+(3 \times 15)+(5 \times 30)+(7 \times 35)+$ $(9 \times 25)+(11 \times 5) = 730$ "730" $\div$ 120 = 6.08333	6.08	4	M1 for use of *fx* with *x* consistent within intervals (including end points) M1 (dep) for use of midpoints M1 (dep on 1st M1) for use of $\frac{\sum fx}{\sum f}$ A1 6.08 to 6.085
	(b)		(10),25,55,90,115, 120	1	B1 for all correct
	(c)		graph	2	B1 ft for 5 or 6 points plotted correctly $\pm$ 1 full (2mm) square at the end of interval dep on sensible table (condone 1 addition error) B1(dep) for points joined by curve or line segments provided no gradient is negative – ignore any part of graph outside range of their points. (SC: B1 if 5 or 6 points plotted not at end but consistent within each interval and joined)

Paper 5523/04				
No	**Working**	**Answer**	**Mark**	**Notes**
(d)		72–74	2	M1 (ft dep on graph being cf) for reading from graph at 7 A1 ft ±1 full (2 mm) square Or B2 for $72-74$
21 (a) (b) (c) (d)		a^7 $15x^3y^4$ $x-1$ $(x+3)(x-3)$	1 2 1 1	B1 accept a^{4+3} B2 cao (B1 for two of 15, x^3, y^4 in a product) B1 cao B1 cao
22	80% = 220 $220 \div 80 \times 100$	275	3	M1 for recognising that 80% is equivalent to 220 M1 for $220 \div 80 \times 100$ oe A1 cao

Paper 5523/04					
No		**Working**	**Answer**	**Mark**	**Notes**
23			$x = 3$ $y = 0.5$	3	M1 for coefficients of x or y the same followed by correct operation, condone one arithmetical error M1 (dep) for substituting found value in one equation A1 cao SC: B1 for one correct answer only if M's not awarded
24			1.4×10^{10}	2	B2 for 1.4×10^{10} or 1.44×10^{10} (B1 for 14.4×10^{9} or 14400,000,000 or 14000,000,000 or 14×10^{9})
25	(a)	$\tan x = \frac{1.9}{3.2}$ $x = \tan^{-1}\left(\frac{1.9}{3.2}\right) = 30.7$	30.7	3	M1 for $\tan x = \frac{1.9}{3.2}$ or $\tan \frac{1.9}{3.2}$ M1 for $\tan^{-1}\left(\frac{1.9}{3.2}\right)$ A1 for 30.6 – 30.7
	(b)	90 + "30.7"	121	1	B1 (indep) ft for 90 + "30.7" rounded to 3 or 4 s.f

Paper 5523/04				
No	**Working**	**Answer**	**Mark**	**Notes**
26	SF$=\frac{12}{9}$ $\frac{12}{9}\times 6=8$	2	2	M1 for $\frac{12}{9}$ or $\frac{9}{12}$ or 1.33… seen or 0.75 seen or 8 seen or $\frac{6}{9}$ or $\frac{9}{6}$ or 0.66… or 1.5 or $\frac{1}{3}$ or 3 oe seen A1 cao

Paper 5525/05					
No		**Working**	**Answer**	**Mark**	**Notes**
1	(a)	$x^2-4x+7x-28$	$x^2+3x-28$	2	M1 for 4 terms correct ignoring signs (e.g $x^2,4x,7x,28$) or 3 terms with correct signs (e.g $x^2,-4x,7x,-28$) A1 cao
	(b)		y^4+2y^2	2	B2 cao B1 for y^4 or $2y^2$
	(c)		$p(p+6)$	2	B2 for $p(p+6)$ or $p\times(p+6)$ (B1 for $p(ap+b)$ where a,b are numbers or $p+6$ seen on it's own, or part of an expression)
	(d)		$3x(2x-3y)$	2	B2 (B1 for $3(2x^2-3xy)$ or $x(6x-9y)$ or $3x(...)$)
2			question + response boxes oe	2	1st aspect: One question with time period (eg each night); ignore other questions. 2nd aspect: Response list (at least two), not overlapping.* 3rd aspect: Some mention of units (eg hours) in either question or responses Award B2 for all three aspects, or B1 for just two aspects. * 0-1, 2-3, 4-5 is OK, but 0-1, 1-2, 2-3 is not OK.
3	(b)		reflection in $y=x$	2	B2 cao accept the word "reflected" (B1 any statement including the word "reflection")
4	(a)	$5-3x=2x+2$ $5-2=2x+3x$	$\frac{3}{5}$	3	B1 for $2x+2$ seen OR $2.5-1.5x=x+1$ M1 for correct rearrangement of 4 terms A1 for $\frac{3}{5}$ oe
	(b)		$-3,-2,-1,0,1,2$	2	B2 (B1 for 5 correct and not more than one incorrect integers)

Paper 5525/05					
No		**Working**	**Answer**	**Mark**	**Notes**
5	(a)	$\frac{2}{3}\times\frac{3}{4}=\frac{6}{12}$	$\frac{1}{2}$	2	M1 for $\frac{6}{12}$ or $\frac{3}{6}$ or $\frac{2\times3}{3\times4}$ A1 accept 0.5
	(b)	$1+2+\frac{8}{12}+\frac{9}{12}$	$4\frac{5}{12}$	2	M1 for attempt to convert to fractions with common denominator e.g two fractions, denominator of 12 A1 correct conversion : $\frac{8}{12}$ and $\frac{9}{12}$, or $\frac{20}{12}$ and $\frac{33}{12}$ seen (oe) A1 cao for $4\frac{5}{12}$ OR attempts to convert to decimals: must use at least 2dp M1 0.66+0.75 (or 1.66+2.75) or 0.67+0.75 etc A1 4.41, 4.417, 4.416 or 0.41, 0.417, 0.416 or 0.42, 4.42 A1 4.416 (*recurring*)
6	(a)(i)		5^6	1	B1 accept 15625, 5^{4+2}
	(ii)		5^3	1	B1 accept 125, 5^{9-6}
	(b)	$x+y=10$ and $x-y=4$	$x = 7$ $y = 3$	3	M1 for either $x + y = 10$ or $x-y=4$ A2 for both values correct [(A1 for one value correct) If M0, award B3 for both values correct or B2 for one value correct, otherwise B0] SC B2 for $x = 3$ or $y = 7$

Paper 5525/05					
No		**Working**	**Answer**	**Mark**	**Notes**
7		$2\times\frac{1}{2}\times6\times8$ or 48 $8\times9+6\times9+10\times9$ or 72 +54 + 90	264 cm^2	4	M1 attempt to find the area of one face; $\frac{1}{2}\times6\times8$ or (8×9) or (6×9) or (10×9) or 72 or 54 or 90 or 24 or 48 M1 all five faces with an intention to add A1 cao numerical answer of 264 B1 (indep) cm^2 with or without numerical answer
8			$\frac{\pi ab^3}{3d}$ $3(c+d)^3$ $3\pi bc^2$	3	B3 (B1 for each one correct) Nb –B1 for each of the 4th,5th,6th tick
9	(a)	$x+0.3+0.2+x=1$	0.25	2	M1 for $x+0.3+0.2+x=1$ oe, or 0.5 ÷ 2 A1 oe
	(b)	0.3×200	60	2	M1 0.3×200 A1 cao Accept 60 out of 200 (in words) SC B1 for $\frac{60}{200}$
10	(a)		$(-12)-4\quad-2\quad(0)8$	3	B3 for all correct [(B1 for each one correct)
	(b)		5 points plotted accurately points joined with smooth curve	2	B1 ±1 full (2mm) square ft table if at least B1 awarded (all 5 points plotted) B1 ft for any smooth curve if previous B1 gained NB: curve must pass within 1 full square of the points
11			m=3 n=5	2	B1 for 3 B1 for 5 (B2 for $2^3\times5$ or $2\times2\times2\times5$) SC: award B1 only if m=3, n=3, for 8×5 seen

Paper 5525/05					
No		**Working**	**Answer**	**Mark**	**Notes**
12		$\frac{5--1}{-1-2}$ = -2	$y=-2x+5$	4	M1 for clear attempt to find gradient eg fraction with -1,5 in numerator, 2,-1 in denominator A1 for -2 cao B2 ft for $y=''-2''x+5$ oe (eg $y=\frac{-6}{3}x+5$) (B1 for $y=mx+5$ or , -2x+5 or $y=''-2''x+c$)
13	(a)		$\frac{1}{4}$ on LH branch $\frac{2}{3}$ & $\frac{1}{3}$ & $\frac{2}{3}$ on RH branches	2	B1 cao B1
	(b)	$\frac{3}{4}\times\frac{2}{3}+\frac{1}{4}\times\frac{1}{3}=\frac{6}{12}+\frac{1}{12}$	$\frac{7}{12}$	3	M1 for $\frac{3}{4}\times\frac{2}{3}$ or $\frac{1}{4}\times\frac{1}{3}$ from their tree diagram M1 for sum of two products A1 for $\frac{7}{12}$ oe
	(c)	$n=21\times4$ or $\frac{1}{6}:\frac{1}{4}$ oe $\frac{1}{6}\times84$ or $21\times\frac{2}{3}$	14	3	M1 for either $\frac{1}{3}\times\frac{3}{4}\left(=\frac{1}{4}\right)$ or $\frac{2}{3}\times\frac{1}{4}\left(=\frac{1}{6}\right)$ from their tree diagram M1 for 21×4 (=84) or $\frac{21}{3}\times2$ A1 for 14 cao SC: B2 for 63 seen in fraction or ratio

Paper 5525/05					
No		Working	Answer	Mark	Notes
14	(a)(i)		150	2	B1 accept 150 or 210
	(ii)				B1 for angle at the centre is twice the angle at the circumference
	(b)		30	3	B1 identifies angle between radius and tangent as 90° (may be in working or on diagram) M1 $360^\circ - 90 - 90 - "150"$ A1 ft from (a)(i) excluding a negative answer Or B1 for 90 M1 for $2 \times (180 - 90 - "\frac{150}{2}")$ A1 ft from (a)(i) excluding a negative answer Or B3 for $180 - (a)$ SC: 180 – "210" can get B1 for 90° and/or B1 for "cyclic quadrilateral"
		$360 - 90 - 90 - "150"$ or $180 - "150"$			
15	(a)		0.2727…	1	B1 for 2.27 recurring or 0.2727…. oe or 0.273
	(b)	eg $x = 0.3939\ldots$ so $100x = 39.3939\ldots$ $99x = 39$ so $x = \frac{39}{99} = \frac{13}{33}$		3	M1 for $100x = 39.39\ldots$ M1 dep for subtraction of both sides A1 for $\frac{13}{33}$ from correct proof **Alternative method** M1 for $13.000 \div 33$ M1 for remainders 31 and 13 A1 for 0.39 recurring SC:B1 for $\frac{39}{99}$

Paper 5525/05					
No		**Working**	**Answer**	**Mark**	**Notes**
16	(a)	$d = kt^2$ $80 = k \times 4^2$	$d = 5t^2$	3	M1 for $d = kt^2$ or $d \propto t^2$ M1 sub d=80 and t=4 into their equation A1 for $d = 5t^2$ oe (cao)
	(b)		245	1	B1 ft from (a) using "k"
	(c)	$45 = 5t^2$	3	2	M1 ft from (a) for substituting d=45 into their equation A1 for 3 cao (condone inclusion of -3)
17	(a)(i) (ii)		(0, 9) (8, 25)	3	B1 cao B1 for $x = 8$ cao B1 for $y = 25$ cao SC: B1 for (25, 8)
	(b)	LHS = $\left(\frac{100-(x^2-16x+64)}{4}\right)$ = $\left(\frac{36+16x-x^2}{4}\right)$ RHS = $\left(\frac{36-2x+18x-x^2}{4}\right)$ = LHS		3	M1 for expansion of either set of brackets with at least 3 of 4 terms correct M1 for common denominator of 4 or multiplying through by 4 or reducing each numerator to a single term A1 for fully correct solution **Alternative method** M1 for $(5-\frac{(x-8)}{2})(5+\frac{(x-8)}{2})$ M1 for $(\frac{2\times5-(x-8)}{2})(\frac{2\times5+(x-8)}{2})$ A1 for $\frac{(18-x)(x+2)}{4}$

Paper 5525/05					
No		Working	Answer	Mark	Notes
18	(a)	$\frac{810\pi}{90\pi}$ or 9 $\sqrt{9}$ or 3	12	3	M1 for $\frac{810\pi}{90\pi}$ or 9 or $\frac{1}{9}$ or 1:9 oe M1 for $\sqrt{\frac{810\pi}{90\pi}}$ or $\sqrt{9}$ or 3 or $\frac{1}{3}$ or $\sqrt{9}:\sqrt{1}$ oe A1 cao
	(b)	3^3 or 27 or 2700	2700π	2	SC:B1 for answer of 36 M1 for "3"^{3} or 27 or $\left(\sqrt{9}\right)^3 : (\sqrt{81})^3$ oe or 9^3 or 2700– A1 cao
19	(a)(i)		1	1	B1 cao
	(ii)		8	1	B1 cao
	(iii)	$64^{-\frac{2}{3}} = \frac{1}{64^{\frac{2}{3}}}$ or $64^{-\frac{2}{3}} = (4^2)^{-1}$	$\frac{1}{16}$	2	M1 for knowing negative power is a reciprocal or power of $\frac{1}{3}$ root is a cube root A1 cao for $\frac{1}{16}$
	(b)	$\sqrt{27} = \sqrt{9\times3}$ or $\sqrt{27} = 3\sqrt{3}$ or $\sqrt{27} = 3^{3/2}$	$\frac{5}{2}$ oe	2	M1 for $\sqrt{27} = \sqrt{9\times3}$ or $\sqrt{27} = 3^{3/2}$ A1 for $\frac{5}{2}$ oe (cao) **Alternative method** M1 for $9\times27 = 3^{2n}$ A1 for $\frac{5}{2}$ oe (cao)

Paper 5525/05					
No		**Working**	**Answer**	**Mark**	**Notes**
20	(a)(i) (ii) (b)(i) (ii)		(90, 1) (180, 0) (45, 0) (90, -3)	2 2 	B1 cao could be indicated on diagram B1 cao could be indicated on diagram B1 cao could be indicated on diagram B1 cao could be indicated on diagram
21		$\frac{1}{3}\pi x^2 h = \frac{4}{3}\pi(2x)^3$ $x^2 h = 4\times 8x^3$	$32x$	3	M1 for substitution in correct formulae M1 (dep.) for correct unsimplified expression eg $h = \frac{\frac{4}{3}\pi(2x)^3}{\frac{1}{3}\pi x^2}$ oe or $h = 8x$ oe A1 for $32x$ cao
22	(a) (b)	$\left(\overline{OM} =\right)\ \boldsymbol{a} + 2\boldsymbol{b}$ $\left(\overline{ON} =\right) 3\boldsymbol{a}$ or $\frac{6}{2}\boldsymbol{a}$ $\left(\overline{MN} =\right)\ -\boldsymbol{a} - 2\boldsymbol{b} + 3\boldsymbol{a}$ $\left(\overline{OX} =\right)\ 2\boldsymbol{a} + \boldsymbol{b}$ $\left(\overline{OY} =\right) \boldsymbol{b} + 4\boldsymbol{a}$ (½ $\overline{QR}$ =) $2\mathbf{a} - \boldsymbol{b}$ or (½ $\overline{RQ}$ =) $\boldsymbol{b} - 2\boldsymbol{a}$	$2\boldsymbol{a} - 2\boldsymbol{b}$ $\overline{XY} = 2\boldsymbol{a}$ (hence parallel)	2 2	B2 (B1 for either $\overline{OM}$ or $\overline{ON}$ or $-\boldsymbol{a} - 2\boldsymbol{b} + 3\boldsymbol{a}$ SC: B1 for $2\boldsymbol{b} - 2\boldsymbol{a}$ B1 for either $\overline{OX}$ or $\overline{OY}$ or (½ $\overline{QR}$) B1 for $\overline{XY} = 2\boldsymbol{a}$ or $\overline{YX} = -2\boldsymbol{a}$

Paper 5525/06					
No		Working	Answer	Mark	Notes
1	(a)	$v - u = 5t$	$\frac{v-u}{5}$	2	M1 for isolating $\pm 5t$ or $\pm t$ or for dividing through by 5 A1 oe
	(b)	$x - 3 = 5x - 25$ $22 = 4x$	$5\frac{1}{2}$	3	M1 for $x - 3 = 5(x-5)$ or $\frac{x}{5} - \frac{3}{5} = x - 5$ M1 for isolating terms in x correctly from $ax + b = cx + d$ A1 cao accept $5\frac{1}{2}$, $\frac{11}{2}$, 5.5
2	(a)	$36 \div (7+3+2)$ "3" $\times 7$	21	3	M1 for $36 \div (7+3+2)$ M1 (dep) for "3" $\times 7$ or 3 or 2 A1 cao
	(b)	$51.5 \times \frac{8.5}{100} = 4.3775$ $51.5 - 4.3775 = 47.1225$	47 or 47.1 or 47.12	4	M1 for $51.5 \times \frac{8.5}{100}$ or 4.37(75) seen M1 (dep) for 51.5 – "4.37(75)" A1 for 47 or better B1 (indep) for rounding their answer correctly to the nearest whole number or 1 or 2 d.p OR M1 for $51.5 \times \frac{100 - 8.5}{100}$ M1 for $51.5 \times$"0.915" or 0.515 ×"91.5" A1 for 47 or better B1 (indep) for rounding their answer correct to the nearest whole number or 1 or 2 d.p

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
3		3→15 4→48 3.1→17.3(91) 3.2→19.9(68) 3.3→22.7(37) 3.4→25.7(04) 3.5→28.8(75) 3.4→25.7(04) 3.3→22.7(37) 3.35→24.1(95375)	3.3	4	B2 for trial between 3.3 and 3.4 inclusive (B1 for trial between 3 and 4 inclusive) B1 for different trial between 3.3 and 3.4 exclusive B1 (dep on at least one previous B1) for 3.3 NB trials should be evaluated to at least 1 dp truncated or rounded
4	(a)		Angle in a semicircle	1	B1 oe
	(b)	$12^2 + 16^2 = 400$ $\sqrt{400} = 20$	20	3	M1 for $12^2 + 16^2$ M1 for $\sqrt{144+256}$ A1 cao
	(c)	$\pi \times 10^2$	314	3	M1 for $\pi \times \left(\frac{"20"}{2}\right)^2$ M1 (indep) for correct order of evaluation of $\pi \times r^2$ for any r A1 for 314 – 315 inclusive

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
5	(a)	$(1 \times 10)+(3 \times 15)+(5 \times 30)+(7 \times 35)+$ $(9 \times 25)+(11 \times 5) = 730$ "730" ÷ 120 = 6.08333	6.08	4	M1 for use of *fx* with *x* consistent within intervals (including end points) M1 (dep) for use of midpoints M1 (dep on 1st M1) for use of $\frac{\sum fx}{\sum f}$ A1 6.08 to 6.085
	(b)		(10),25,55,90, 115,120	1	B1 for all correct
	(c)		graph	2	B1 ft for 5 or 6 points plotted correctly ± 1 full (2mm) square at the end of interval dep on sensible table (condone 1 addition error) B1(dep) for points joined by curve or line segments provided no gradient is negative – ignore any part of graph outside range of their points. (SC: B1 if 5 or 6 points plotted not at end but consistent within each interval and joined)
	(d)		72 – 74	2	M1 (ft dep on graph being cf) for reading from graph at 7 A1 ft ±1 full (2 mm) square Or B2 for 72 – 74

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		a^7	1	B1 accept a^{4+3}
	(b)		$15x^3y^4$	2	B2 cao (B1 for two of 15, x^3, y^4 in a product)
	(c)		$x-1$	1	B1 cao
	(d)		$(a + 3b)(a - 3b)$	2	B2 for $(a + 3b)(a - 3b)$ (B1 for $(a \pm 3b)(a \pm 3b)$
7		80% = 220 $220 \div 80 \times 100$	275	3	M1 for recognising that 80% is equivalent to 220 M1 for $220 \div 80 \times 100$ oe A1 cao
8			$x = 3$ $y = 0.5$	3	M1 for coefficients of x or y the same followed by correct operation, condone one arithmetical error M1 (dep) for substituting found value in one equation A1 cao SC: B1 for one correct answer only if Ms not awarded
9			1.4×10^{10}	2	B2 for 1.4×10^{10} or 1.44×10^{10} (B1 for 14.4×10^9 or 14400,000,000 or 14000,000,000 or 14×10^9)

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
10	(a)	$\tan x = \frac{1.9}{3.2}$ $x = \tan^{-1}\left(\frac{1.9}{3.2}\right) = 30.7$	30.7	3	M1 for $\tan x = \frac{1.9}{3.2}$ or $\tan \frac{1.9}{3.2}$ M1 for $\tan^{-1}\left(\frac{1.9}{3.2}\right)$ A1 for 30.6 – 30.7
	(b)	90 + "30.7"	121	1	B1 (indep) ft for 90 + "30.7" rounded to 3 or 4 s.f
11	(a)	$SF = \frac{12}{9}$ $\frac{12}{9} \times 6 = 8$	2	2	M1 for $\frac{12}{9}$ or $\frac{9}{12}$ or 1.33… seen or 0.75 seen or 8 seen or $\frac{6}{9}$ or $\frac{9}{6}$ or 0.66… or 1.5 or $\frac{1}{3}$ or 3 oe seen A1 cao
	(b)	$SF = \frac{9}{12}, \frac{9}{12} \times 7 = 5.25$	5.25	2	M1 for $\frac{BE}{7} = \frac{9}{12}$ oe A1 cao

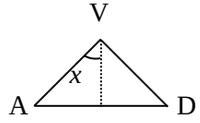
Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
12	(a)	$84 = 6.7\pi + 2 \times 6.7 + 2a$ $2a + 13.4 = 62.95\ldots$ or $2a + 34.44 = 84$	24.8	3	M1 for substituting correctly, π may be left M1 for correct rearrangement as far as $\pm 2a$ A1 for $24.7 - 24.8$
	(b)	$P = \pi r + 2r + 2a$ $P - 2a = \pi r + 2r$ $P - 2a = (\pi + 2)r$	$\frac{P-2a}{\pi+2}$	3	M1 subtracting $2a$ from each side M1 for factorising to get $(\pi+2)r$ A1 for $\frac{P-2a}{\pi+2}$ oe S.C $\frac{p-2a}{5.14}$ oe is M1 M1 A0
13		Area $\Delta ABC = \frac{1}{2} \times 14 \times 8 \times \sin 106$ (= 53.8)	53.8	3	M1 for $\frac{1}{2} \times 14 \times 8 \times \sin 106$ M1 (dep) for $56 \times 0.961(26..)$ or $107.6\ldots$ A1 $53.8 - 53.9$ SC 107.6 is B2
14	(a)		4.5	1	B1 cao
	(b)	$500 \times 1.045^{20} = 1205.857\ldots\ldots$	1205.86	2	M1 for 500×1.045^{20} A1 for $1205.85 - 1206$ (SC:B1 for $705.85 - 706$ no working)

Paper 5525/06				
No	**Working**	**Answer**	**Mark**	**Notes**
15 (a)	$6x^2 + 11x - 10 + 6x - 4 = 25$ $6x^2 + 17x - 39 = 0$		3	M1 for an expression for the area involving either $(3x-2)(2x+5)+2(3x-2)$ or $3x(3x-2)+(3x-2)(7-x)$ or $3x(2x+5)-2(7-x)$ or $(3x-2)^2 + 2(3x-2) + (3x-2)(7-x)$ where in each case at least one of 2 or 3 product terms must be correct M1 (indep) for one correct expansion involving x^2 A1 for simplification to final answer

Paper 5525/06					
No		Working	Answer	Mark	Notes
15	(b)(i)	$x = \frac{-17 \pm \sqrt{17^2 - 4\times 6\times(-39)}}{2\times 6}$ $= \frac{-17 \pm \sqrt{289+936}}{12}$ $x = +\frac{18}{12}$ or -4.33	1.5, $-\frac{13}{3}$	4	M1 for $x = \frac{-17 \pm \sqrt{17^2 - 4\times 6\times(-39)}}{2\times 6}$ up to signs in b & c M1 for $x = \frac{-17 \pm \sqrt{1225}}{12}$ A1 $x = 1.5$ or -4.33, or better OR M2 for $(3x+13)(2x-3)$ (M1 for $(3x \pm a)(2x \pm b)$ with ab = ±39 A1 x = 1.5 or – 4.33, or better
		$x^2 + \frac{17}{6}x - \frac{39}{6} = 0$ $\left(x+\frac{17}{12}\right)^2 - \left(\frac{17}{12}\right)^2 - \frac{39}{6} = 0$ $\left(x+\frac{17}{12}\right)^2 = \left(\frac{17}{12}\right)^2 + \frac{39}{6}$			OR M1 for $\left(x+\frac{17}{12}\right)^2$ *seen* M1 $\left(x+\frac{17}{12}\right)^2 = \left(\frac{17}{12}\right)^2 + \frac{39}{6}$ A1 x = 1.5 or – 4.33, or better SC:M1 for answer "1.5" with no working or T & I
	(ii)		8		B1 cao length = 8

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
16	(a)	P(win) = $\frac{2}{5}\times\frac{3}{5}+\frac{2}{5}\times\frac{1}{5}(=\frac{8}{25})$	$\frac{8}{25}$	3	M1 for $\frac{2}{5}\times\frac{3}{5}$ or $\frac{2}{5}\times\frac{1}{5}$ or for clearly identifying in P(R) $\times$P(R) + P(B) $\times$ P(B) M1 for P(win) = " $\frac{2}{5}$ " $\times$ " $\frac{3}{5}$ " + " $\frac{2}{5}$ " $\times$ " $\frac{1}{5}$ " A1 for $\frac{8}{25}$, oe
	(b)	$\frac{8}{25}$ $\times$ 100 (=32) 100 $\times$ 20 – "32" $\times$ 50	£4	2	M1 for (" $\frac{8}{25}$ " $\times$100)$\times$50 or $\times$ 0.5 A1 cao

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
17		Lower bound of 1200 is 1150 Upper bound of 60 is 65 $1150 \div 65$	17	4	B1 for 1150 or 1250 seen B1 for 65 or 55 seen M1 (Lower bound of load) ÷ (Upper bound of weight) Where 1150 ≤ LB load < 1200 and 60 < UB Weight ≤ 65 A1 for 17 requires fully correct working OR B1 for 1150 or 1250 seen B1 for 65 or 55 seen M1 (upper bound of load) ÷(lower bound of weight) Where 1200 ‹ UB load ≤ 1250 and 55 ≤ LB weight < 60 A1 for 22 requires fully correct working OR M2 $1200 \div 55$ A1 21.8 A1 21 requires fully correct working OR M2 $1200 \div 65$ A1 18.4(6) A1 18 requires fully correct working
18	(a)	$3^4 x^4 y^8$	$81x^4y^8$	2	B2 for $81x^4y^8$ (B1 for 2 of 81, x^4, y^8)
	(b)	$\frac{x(x-3)}{(x-5)(x-3)}$	$\frac{x}{x-5}$	3	B1 for $x(x-3)$ B1 for $(x-5)(x-3)$ B1 cao

Paper 5525/06					
No		Working	Answer	Mark	Notes
19	(a)	$6^2 - 2^2 = 32$	5.66	2	M1 for $6^2 - 2^2$ (= 32) A1 5.65 – 5.66
	(b)	V  $DVA = 2 \times \sin^{-1}(\frac{2}{6})$ OR $\cos DVA = \frac{6^2 + 6^2 - 16}{2 \times 6 \times 6}$ $= \frac{56}{72}$ $DVA = \cos^{-1}\left(\frac{56}{72}\right) = 38.94$	38.9	3	M1 $\sin x = \frac{2}{6}$ oe M1 for $DVA = 2 \times \sin^{-1}(\frac{2}{6})$ A1 38.9 – 38.95 OR M1 for $(\cos DVA =) \frac{6^2 + 6^2 - 4^2}{2 \times 6 \times 6}$ M1 for $DVA = \cos^{-1}\left(\frac{56}{72}\right)$ A1 38.9 – 38.95

Paper 5525/06				
No	**Working**	**Answer**	**Mark**	**Notes**
19 (c)	$AC^2 = 2^2 + 2^2 - 2 \times 2 \times 2 \times \cos 120^o$ $AC = \sqrt{12}$ **OR** $AN = 2 \times \sin 60 = \sqrt{3}$ **OR** VN = $\sqrt{"32"+1} = \sqrt{33}$ $\cos AVC = \frac{6^2 + 6^2 - 12}{2 \times 6 \times 6}$ $\cos AVC = \frac{60}{72}$ **OR** $AVC = 2 \times \sin^{-1}\frac{\sqrt{3}}{6}$, using AN **OR** $AVC = 2 \times \cos^{-1}\frac{\sqrt{33}}{6}$, using VN	33.6	4	M1 for any valid method for AC or AN or VN where N is the midpoint of AC A1 for $AC^2 = 12$ or $AC = \sqrt{12}$ (= 3.46…) or $AN = \sqrt{3}$ (=1.73…)or $VN = \sqrt{33}$ (=5.74…) M1 (indep) for correct method to find angle AVC A1 33.55 – 33.6

Paper 5525/06					
No		**Working**	**Answer**	**Mark**	**Notes**
20	(a)	Graph translated 1 unit to the right passing through the points (-1,0), (1,2) and (2,0)		2	M1 for translation of $\begin{pmatrix}1\\0\end{pmatrix}$ or $\begin{pmatrix}-1\\0\end{pmatrix}$ A1 for right through the 3 points, $\pm\frac{1}{4}$ sq
	(b)	Graph stretched 2 units parallel to y-axis; passing through the points (-2,0), (0,4) and (1,0)		2	M1 for graph stretched parallel to the y-axis by scale factor 2 A1 through all 3 points; $\pm\frac{1}{4}$ sq not on grid at $x = 2$

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

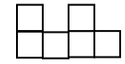
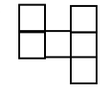
12 Parts of questions
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

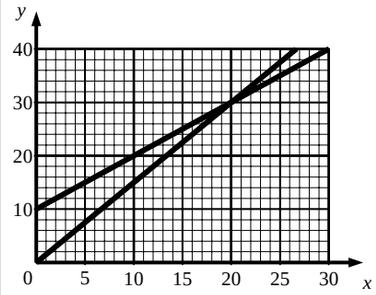
1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		380	1	B1 cao
	(b)		6.2	1	B1 cao
	(c)		Arrow at 34	1	B1 cao
2	(a)		8	1	B1 for 8 ± 0.2
	(b)		35	1	B1 for 35 ± 2°
	(c)		Circle drawn	1	B1 for all parts within ± 2mm, (use overlay)
3	(a)		4, 7, 4, 3, 2	2	M1 for at least 3 correct tallies **or** at least 3 correct frequencies A1 for all frequencies correct
	(b)		7	1	B1 for 7 **or** ft from frequencies in (a) or tallies if no frequencies
	(c)		Diagram drawn	3	M1 for bar chart or other suitable chart with at least 3 correct heights for their scale (can f.t.) A1 for all 5 bars correctly labelled and vertical axis correctly scaled A1 for fully correct **or** ft frequencies in (a) **OR** M1 for pictogram with at least 3 correct rows (can f.t.) A1 for correct labels on all 5 rows and correctly key A1 for fully correct **or** ft frequencies in (a) **OR** M1 for pie chart with at least 3 correct sectors ± 2° (can f.t.) A1 for all 5 sectors correctly labelled A1 for fully correct **or** ft frequencies in (a)

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		£1.18 + 94p = £2.12 £5 – £2.12 – 30p = £2.58 £2.58 ÷ 2 =	1.29	3	M2 for (5 – 1.18 – 0.94 – 0.30) ÷ 2 oe **or** digits 129 (M1 for 1.18 + 0.94 **or** 2.12 seen **or** 1.18 + 0.94 + 0.30 oe **or** 2.42 seen **or** 5 – 1.18 – 0.94 oe **or** 2.88 seen **or** (5 – 1.18 – 0.94) ÷ 2 **or** 1.44 seen **or** 5 – 1.18 – 0.94 – 0.30 oe **or** 2.58 seen) A1 cao **NOTE**: Accept working in £ or pence
5	(a)(i)		(2, 3)	2	B1 cao
	(ii)		(–3, 1)		B1 cao
	(b)		Point plotted at (3, –4)	1	B1 cao
6	(a)		– 5	1	B1 cao
	(b)		6	1	B1 for 6 or – 6
	(c)		3	1	B1 cao
7			(P, B), (P, S), (P, L) (M, B), (M, S), (M, L) (H, B), (H, S), (H, L)	2	M1 for any 3 combinations with no incorrect combinations A1 for all 9 combinations with no duplicates or extras
8	(a)		Walk	1	B1 cao
	(b)	24 ÷ 4 =	6	2	M1 for 24 ÷ 4 oe or ¼ oe seen A1 cao

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
9	(a)		Isosceles triangle	1	B1 for isosceles triangle
	(b)		Rectangle with area 12 cm^2	2	M1 for rectangle drawn A1 cao
10	(a)		A marked at 0	1	B1 for A marked at 0 (within overlay)
	(b)		B marked at 1/4	1	B1 for B marked at 1/4 (within overlay)
11	(a)		9	1	B1 cao
	(b)		33	2	M1 for 5 × 5 **or** 25 seen in the working **or** 2 × 2 × 2 **or** 8 seen in the working A1 cao
12	(a)		20	2	M1 3 × 3 × 3 oe seen or drawn or 27 seen or use of 3 layers A1 cao
	(b)			2	B2 for correct view (B1 for  or )
13	(a)(i)		07 29	2	B1 for 07 29
	(ii)		36		B1 for 36 or ft difference between (i) and 06 53
	(b)		07 51	1	B1 cao
	(c)		09 55	1	B1 for 09 55 or 9 55 or five to ten

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
14		2 + 8 + 2 + 8 = 20 20 ÷ 4 =	5	4	M2 for 2 + 8 + 2 + 8 oe **or** 20 seen **or** (2 + 8) ÷ 2 oe (M1 for the sum of 3 sides of the rectangle) M1 (dep) for the sum of 3 or 4 sides of the rectangle ÷ 4 **or** an attempt to evaluate (2 + 8) ÷ 2 oe to get the length of one side A1 cao **SC**: B1 for an answer of 4 coming from $\sqrt{2\times 8}$ oe
15	(a)		4	1	B1 cao
	(b)	9.5 – 4.75 = **OR** 9.5 ÷ 2 =	4.75	2	M1 for 9.5 – 4.75 **or** 9.5 ÷ 2 **or** 4.75 – 9.5 A1 cao
	(c)		6	1	B1 cao
	(d)	12 × 4 =	48	2	M1 for × 4 seen **or** identifying + 0.5 for every 2 inches **or** 12 + 12 + 12 + 12 oe **or** build up method eg 12, 24, 36, 48 allow one error A1 cao
16	(a)		trapezium	1	B1 for trapezium or isosceles trapezium
	(b)			2	B2 for correct tessellation (at least 5 more shapes) (B1 for at least 4 shapes (including initial shape) correctly tessellating)

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
17*		S: 35 ÷ 100 × 40 = 14 W: 40 ÷ 8 × 3 = 15 **OR** D: 16 ÷ 40 (× 100) = 0.4 (40%) W: 3 ÷ 8 (× 100) = 0.375 (37.5%) **OR** D: $\frac{16}{40} = \frac{80}{200}$ S: $\frac{35}{100} = \frac{70}{200}$ W: $\frac{3}{8} = \frac{75}{200}$	Debbie and correct calculations	4	**Compares Marks out of 40 or fractions with denominator of 40** M1 for 35 ÷ 100 × 40 oe **or** 14 seen (or 14/40 seen) M1 for 40 ÷ 8 × 3 **or** 15 seen (or 15/40 seen) A1 for 14 and 15 **or** $\frac{14}{40}$ and $\frac{15}{40}$ C1 (dep on M1) for correct conclusion for their working QWC with 3 comparable marks: Decision and justification should be clear with working clearly presented and attributable. **OR Decimals (or Percentages)** M1 for 16 ÷ 40 (× 100) oe **or** 0.4 (or 40) seen M1 for 3 ÷ 8 (× 100) oe **or** 0.375 (or 37.5) seen A1 for 0.4 and 0.375 (**or** 40 and 37.5) C1 (dep on M1) for correct conclusion for their working QWC: with 3 comparable decimals (or percentages: Decision and justification should be clear with working clearly presented and attributable. **OR Compares Fractions with denominator other than 40** M1 for attempt to convert all to fractions with a common denominator other than 40 M1 for at least 1 correct A1 for $\frac{80}{200}$ and $\frac{70}{200}$ and $\frac{75}{200}$ oe C1 (dep on M1) for correct conclusion for their working QWC with 3 comparable fractions: Decision and justification should be clear with working clearly presented and attributable.

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
18*	(a)		10	1	B1 cao
	(b)	 **Miles** 0 10 20 30 40 50 **Ed** 0 15 30 45 60 75 **Bill** 10 20 30 40 50 60	Ed is cheaper up to 20 miles, Bill is cheaper for more than 20 miles	3	M1 for correct line for Ed intersecting at (20,30) ±1 sq tolerance **or** $10 + x = 1.5x$ oe C2 (dep on M1) for a correct full statement ft from graph eg. Ed cheaper up to 20 miles **and** Bill cheaper for more than 20 miles (C1 (dep on M1) for a correct conclusion ft from graph eg. cheaper at 10 miles with Ed ; eg. cheaper at 50 miles with Bill eg. same cost at 20 miles; eg for £5 go further with Bill **or** A general statement covering short **and** long distances eg. Ed is cheaper for shorter distances **and** Bill is cheaper for long distances) **OR** (continued on next page)

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
18 (contd)					**OR** M1 for correct method to work out Ed's delivery cost for at least 2 values of n miles where $0 < n \leq 50$ **or** for correct method to work out Ed and Bill's delivery cost for n miles where $0 < n \leq 50$ C2 (dep on M1) for 20 miles linked with £30 for Ed and Bill with correct full statement eg. Ed cheaper up to 20 miles **and** Bill cheaper for more than 20 miles (C1 (dep on M1) for a correct conclusion eg. cheaper at 10 miles with Ed; eg. cheaper at 50 miles with Bill eg. same cost at 20 miles; eg for £5 go further with Bill **or** A general statement covering short **and** long distances eg. Ed is cheaper for shorter distances **and** Bill is cheaper for long distances) SC: B1 for correct full statement seen with no working eg. Ed cheaper up to 20 miles **and** Bill cheaper for more than 20 miles QWC Decision and justification should be clear with working clearly presented and attributable

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
19		1,96 × 2.25 = 4.41 **OR** 4.23 ÷ 9 = 0.47 1.96 ÷ 4 = 0.49 **OR** 4.23 × 4 = 16.92 1.96 × 9 = 17.64 **OR** 4.23 ÷ 9 = 0.47 0.47 × 4 = 1.88 **OR** 1.96 ÷ 4 = 0.49 0.49 × 9 = 4.41 **OR** 9 ÷ 4.23 = 2.12 4 ÷ 1.96 = 2.04	Pack of 9	3	M2 for a fully correct method to enable a conclusion eg 1.96 × 2¼ **OR** M1 for 4.23 ÷ 9 or 423 ÷ 9 **or** 0.47 seen **or** 47 seen M1 for 1.96 ÷ 4 or 196 ÷ 4 or 0.49 seen or 49 seen **OR** M1 for 4.23 × 4 **or** 423 × 4 **or** 16.92 seen **or** 1692 seen M1 for 1.96 × 9 **or** 196 × 9 **or** 17.64 seen **or** 1764 seen **OR** M1 for 4.23 ÷ 9 **or** 423 ÷ 9 **or** 0.47 seen **or** 47 seen M1 for 0.47 × 4 **or** 47 × 4 **or** 1.88 seen **or** 188 seen **OR** M1 for 1.96 ÷ 4 **or** 196 ÷ 4 **or** 0.49 seen **or** 49 seen M1 for 0.49 × 9 **or** 49 × 9 **or** 4.41 seen **or** 441 seen **OR** M1 for 9 ÷ 4.23 **or** 2.12(...) seen **or** 2.13 seen M1 for 4 ÷ 1.96 **or** 2.04(...) seen A1 for Pack of 9 and fully correct calculations **NOTE:** B0 for an answer of 9 not supported by working.
20	(a)		6	1	B1 cao
	(b)		44	1	B1 cao
	(c)		31	2	M1 for 60 – 29 **or** 29 – 60 **or** any correct method that is attempting to find the difference between 29 and 60 (allow 1 arithmetic error) A1 cao

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
21*		Angle *DBC* = (180 – 50) ÷ 2 Base angles of isosceles triangle are equal Angle *ABD* = 180 – 65 Angles on a straight line add up to 180 *x* = 180 – 20 – 115 Angles in a triangle add up to 180 **OR** Angle *DBC* = (180 – 50) ÷ 2 Base angles of isosceles triangle are equal *x* = 65 – 20 Exterior angle of triangle is equal to sum of interior opposite angles **OR** Angle *DCB* = (180 – 50) ÷ 2 Base angles of isosceles triangle are equal *x* = 180 – 50 – 20 – 65 Angles in a triangle add up to 180	45 with reasons	4	M1 for (180 – 50) ÷ 2 oe **or** 65 seen M1 for 180 – 20 – (180 – "65") **or** "65" – 20 or 180 – 50 – 20 –'65' oe C2 for *x* identified as 45 with full reasons QWC: Reasons clearly laid out with correct geometrical language used (C1 (dep on M1) for one reason QWC: Reasons clearly laid out with correct geometrical language used) NOTE: *x* = 45 with no working or without any correct angles marked on the diagram cannot score.

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Question		**Working**	**Answer**	**Mark**	**Notes**
22	(a)	360 ÷ 60 = 6 300 ÷ 60 = 5 6 × 5 =	Yes and 30	3	M1 for dividing side of patio by side of paving slab eg 360 ÷ 60 **or** 300 ÷ 60 **or** 3.6 ÷ 0.6 **or** 3 ÷ 0.6 **or** 6 and 5 seen **or** 6 divisions seen on length of diagram **or** 5 divisions seen on width of diagram M1 for correct method to find number of paving slabs eg (360 ÷ 60) × (300 ÷ 60) oe **or** 6 × 5 **or** 30 squares seen on diagram (units may not be consistent) A1 for Yes **and** 30 (or 2 extra) with correct calculations **OR** M1 for correct method to find area of patio **or** paving slab eg 360 × 300 **or** 108000 seen **or** 60 × 60 **or** 3600 seen **or** 3.6 × 3 **or** 10.8 seen **or** 0.6 × 0.6 **or** 0.36 seen M1 for dividing area of patio by area of a paving slab eg. (3.6 × 3) ÷ (0.6 × 0.6) oe (units may not be consistent) A1 for Yes **and** 30 (or 2 extra) with correct calculations **OR** M1 for method to find area of patio and area of 32 slabs eg. 60 × 60 × 32 **or** 360 × 300 M1 for method to find both areas eg. 60 × 60 × 32 **and** 360 × 300 (units may not be consistent) A1 for Yes **and** 115200 **and** 108000 **OR** Yes **and** 11.52 **and** 10.8 **NB :** Throughout the question, candidates could be working in metres or centimetres

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
22	(b)	1726 25890 27616 **8 6 3** **2** 2 4 1 8 9 **3** **7** 1 6 1 2 6 **2** 6 1 6 800 60 3 30 24000 1800 90 2 1600 120 6 24000 + 1800 + 90 + 1600 + 120 + 6 = 27616	276.16	3	M1 for complete correct method with relative place value correct. Condone 1 multiplication error, addition not necessary. **OR** M1 for a complete grid. Condone 1 multiplication error, addition not necessary. **OR** M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary. A1 for digits 27616 A1 ft (dep on M1) for correct placement of decimal point after addition (of appropriate values) (SC: B1 for attempting to add 32 lots of 8.63)
23	(a)		30	2	M1 for 25 ÷ 10 **or** 2.5 seen **or** 10 ÷ 25 **or** 0.4 seen **or** 12+12+6 oe **or** a complete method eg. 25×12÷10 oe A1 cao
	(b)	1000 ÷ 200 × 12	60	2	M1 for 500 ÷ 50 **or** 1000 ÷ 200 **or** 500 ÷ 10 **or** correct scale factor clearly linked with one ingredient eg 10 with sugar or 5 with butter or flour or 50 with milk **or** an answer of 120 or 600 A1 cao

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
24		Acton after 24, 48, 72, 96, .. Barton after 20, 40, 60, 80, .. LCM of 20 and 24 is 120 9:00 am + 120 minutes **OR** Acton after 24, 48, 1h 12 min... Barton after 20, 40, 1 h LCM is 2 hours 9:00 am + 2 hours **OR** Times from 9:00 am when each service leaves the bus station Acton at 9:24, 9:48, 10:12.. Barton at 9:20, 9:40, 10:00.. **OR** 20 = 2 × 2 × 5 24 = 2 × 2 × 2 × 3 2 × 2 × 2 × 3 × 5 = 120	11:00 am	3	M1 for listing multiples of 20 and 24 with at least 3 numbers in each list ; multiples could be given in minutes or in hours and minutes (condone one addition error in total in first 3 numbers in lists) A1 identify 120 (mins) **or** 2 (hours) as LCM A1 for 11:00 (am) **or** 11(am) **or** 11 o'clock **OR** M1 for listing times after 9am when each bus leaves the bus station, with at least 3 times in each list (condone one addition error in total in first 3 times after 9am in lists) A1 for correct times in each list up to and including 11:00 A1 for 11:00 (am) **or** 11(am) **or** 11 o'clock **OR** M1 for correct method to write 20 and 24 in terms of their prime factors 2, 2, 5 and 2, 2, 2, 3 (condone one error) A1 identify 120 as LCM A1 for 11:00 (am) **or** 11(am) **or** 11 o'clock

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		$6y - 15$	1	B1 cao
	(b)		$4x(2x + y)$	2	B2 cao (B1 for $x(8x + 4y)$ **or** $2x(4x + 2y)$ **or** $4(2x^2 + xy)$ **or** $4x(ax + by)$ where a, b are positive integers **or** $ax(2x + y)$ where a is a positive integer **or** $4x(2x \quad y)$)
	(c)	$10t = gh$ $h = \frac{10t}{g}$	$\frac{10t}{g}$	2	M1 for clear intention to multiply both sides of the equation by 10 (eg. ×10 seen on both sides of equation) **or** clear intention to divide both sides of the equation by g (eg. ÷ g seen on both sides of equation) **or** $10t = gh$ **or** $\frac{t}{g} = \frac{h}{10}$ **or** fully correct reverse flow diagram eg. ← ×10 ← ÷g ← A1 for $\frac{10t}{g}$ oe

1MA0_1F					
Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)	$2 \times 5 \times 2 = 20$ $300 \div 20 =$	15	3	M2 for $300 \div (2 \times 5 \times 2)$ oe (M1 for $2 \times 5 \times 2$ **or** 20 seen **or** $300 \div (2 \times 5)$ **or** 30 seen A1 cao
	(b)	$c = \frac{30 \times 40}{150}$ =	8	2	M1 for $\frac{30 \times 40}{150}$ **or** 1200 seen A1 cao
27		$3x - 15 = 2x + 24$ $x = 39$ **OR** $2x + 3x - 15 + 2x + 2x + 24 = 360$ $9x + 9 = 360$ $9x = 351$ $x = 39$ **OR** $2x + 2x + 24 = 180$ $4x + 24 = 180$ $4x = 156$ $x = 39$ **OR** $2x + 3x - 15 = 180$ $5x - 15 = 180$ $5x = 195$ $x = 39$	39	3	M1 for forming an appropriate equation eg $3x - 15 = 2x + 24$ **or** $2x + 3x - 15 + 2x + 2x + 24 = 360$ oe **or** $2x + 2x + 24 = 180$ oe **or** $2x + 3x - 15 = 180$ oe **or** $2x + 3x - 15 = 2x + 2x + 24$ M1 (dep) for correct operation(s) to isolate x and non-x terms in an equation to get $ax = b$ A1 cao **OR** M2 for $\frac{351}{9}$ **or** $\frac{195}{5}$ **or** $\frac{156}{4}$ oe A1 cao

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

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10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*1			small and correct answers	3	M1 for 4.2 ÷ 1.75 (=2.4(0)) **or** 8.68 ÷ 3.5 (=2.48) M1 for 4.2 ÷ 1.75 (=2.4(0)) **and** 8.68 ÷ 3.5 (=2.48) C1 (dep on at least M1) for small and (£)2.4(0) and (£)2.48 **OR** M1 for 1.75 ÷ 4.2 (=0.41(6)) **or** 3.5 ÷ 8.68 (=0.40(3)) M1 for 1.75 ÷ 4.2 (=0.41(6)) **and** 3.5 ÷ 8.68 (=0.40(3)) C1 (dep on at least M1) for small and 0.41(6)(kg) and 0.40(3)(kg) **OR** M1 for 4.2 ÷ 1.75 (=2.4(0)) **or** 8.68 ÷ 3.5 (=2.48) M1 for (4.2 ÷ 1.75) × 3.5 (=8.4(0)) or (8.68 ÷ 3.5) × 1.75 (=4.34) C1 (dep on at least M1) for small and (£)8.4(0) or for small and (£)4.34 **OR** M1 for 1.75 ÷ 4.2 (=0.41(6)) or 3.5 ÷ 8.68 (=0.40(3)) M1 for (1.75 ÷ 4.2) × 8.68 (=3.61(6)) or (3.5 ÷ 8.68) × 4.2 (=1.69(3)) C1 (dep on at least M1) for small and 3.61(6)(kg) or 1.69(3)(kg) **OR** M2 for 8.68 ÷ 2 (=4.34) or 4.20 × 2 (=8.40) C1 (dep on at least M1) for small and (£)4.34 or (£8.40) **OR** Any other method considered equivalent. Figures may be truncated or rounded as long as their method is clear.

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
2		$7 \times 8^2 + 320 = 448 + 320$ 768p = 7.68	£7.68	3	M1 for 7×8^2 or 448 seen A1 for 768 B1 for correct monetary answer written correctly eg £7.68 or 768p
3			correct shaded region	2	B1 for arc of circle, centre oak tree, radius 4cm(±2mm) B1 for shaded region where the tree can be planted, bounded by sides of garden and arc of circle centre oak tree
4	(a)		−3, −2, −1,0,1	2	B2 for all 5 values and no others (B1 for 4 correct values and no others or -4,-3,-2,-1,0,1 or -3,-2,-1,0,1,2
	(b)		$-2 \leq x < 4$	2	B2 for $-2 \leq x < 4$ (B1 for $-2 \leq x$ or $x < 4$ or $-2 < x \leq 4$) [Note: accept the use of any letter other than x throughout and ignore any attempt to list integer values]
5			25.1-25.2	2	M1 for $2 \times 3.142 \times 4$ or 8π oe A1 for 25.1 – 25. 2
6	(a)		5, −4, −3	2	B2 for 5, −4 and −3 (B1 for 5 or −4 or −3)
	(b)		correct curve	2	B2 for fully correct curve (B1 ft for at least 5 points plotted correctly)

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7			enlargement, scale factor 2, centre (6, −5)	3	B1 for enlargement B1 for (scale) factor 2 or ×2 or sf 2 B1 for (6, −5) NB: award 0 marks for an explanation that includes reference to more than one transformation.
*8		Cost of wages, rent and other expenses last year 92 000+10 800+7000=109 800 Cost of wages, rent and other expenses this year $1.075\times92\,000 + \frac{7}{9} \times 10$ 800 + 7000÷2 = 98 900+8400+3500 = 110 800 Costs are more this year, so she cannot increase the amount she spends on goods	no, with working and reason	4	M1 for an attempt to calculate using 7.5% and 92000 (eg 7.5% of 92000 or increase of 7.5%) eg 92000 + 6900 or 98900 M1 for an attempt to find a fractional amount of 10800 (eg $\frac{7}{9}$ × 10800 or 8400 or $\frac{2}{9}$ × 10800 or 2400) M1 for complete method of increasing 92000 by 7.5%, finding $\frac{7}{9}$ of 10800, and halving 7000, with at least all of these three added together. C1 for statement eg "no" with both 110800 & 109800 seen, OR "no" with "1000 more" OR "no" and compares 181800 with 182800, oe.
9	(a)	$\sqrt{30} = 5.4772255\ldots$ $2.5^2 = 6.25$ 5.4772255...÷ 6.25 =	0.876	2	M1 for $\sqrt{30} \div 6.25$ or $5.4(7\ldots) \div 2.5^2$ A1 for any answer in the range 0.876 to 0.877
	(b)	4.5 × 1000 × 1000	4 500 000	2	M1 for complete method equivalent to 4.5 × 1000 × 1000 A1 for 4 500 000 oe

PMT

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10		3 → 21 4 → 56 3.1 → 23.5(9) 3.2 → 26.3(6) 3.3 → 29.3(3) 3.4 → 32.5(0) 3.5 → 35.8(7) 3.6 → 39.4(5) 3.7 → 43.2(5) 3.8 → 47.2(7) 3.9 → 51.(5) 3.35 → 30.8(9)	3.3	4	B2 for a trial between 3.3 and 3.4 inclusive (B1 for a trial between 3 and 4 inclusive) B1 for a different trial between 3.3 and 3.4 exclusive B1 (dep on at least one previous B1) for 3.3 NB trials should be evaluated to at least 1dp truncated or rounded
11			45	3	M1 for 60000 × 0.75 or ÷1000 or digits 45 or the numbers 60 or 0.00075) M1 for the complete method 60 000 × 0.75 ÷ 1000 oe A1 cao
12	(a)		−7	2	M1 for an attempt to get *x*s on one side or number terms on one side A1 cao
	(b)		8.5	2	M1 for an attempt to divide each side by 4 or an attempt to expand the bracket eg $4 \times x - 4 \times 5$ A1 for 8.5 oe

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*13		2500×0.04×2 =£200 2500×$(1.039)^2$ = £2698.80 £2698.80 – £2500 = £198.80 Scheme A gives £1.20 more	statement	4	M1 for a correct method to find 4% of 2500 or 3.9% of 2500 A1 for a correctly calculated amount 2700 or 2698.8(0) or 200 or 198.8(0); or percentage rate calculated over the 2 years for comparison: 3.93% or 3.976% oe M1 for a correct compound interest method using 3.9% and 2500 over 2 years C1 for statement of scheme A, with two correct comparable figures.
14		$3x - 2y = 7$ $7x + 2y = 13$ $10x = 20$ $x = 2$ $3\times2 - 2y = 7$ $-2y = 1$ $y = -0.5$	2, −0.5	3	M1 for a correct process to eliminate either x or y (allow one arithmetic error) M1 (dep) for correct substitution of their found variable or an otherwise correct method to eliminate the other variable A1 for 2 and −0.5 oe
15	(a)		3.7×10^{-3}	1	B1 cao
	(b)		49 000	1	B1 cao
	(c)	500 ÷ 250 000 [= 0.002] OR $(5 \times 10^2) \div (2.5 \times 10^5)$ [= $(5\div2.5)\times10^{2-5}$] OR $\frac{500}{250} \times \frac{1}{10^3}$ [= 2×10^{-3}] OR $\frac{500\div100}{250000\div100} = \frac{5}{2500}$ [= 0.002]	2×10^{-3}	2	M1 for an attempt to divide using two numbers that are in consistent form eg following an attempt to convert to ordinary numbers, or standard form numbers. A1 for 2×10^{-3}

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
16			12.7	3	M1 for 3.142 × 5 × 5 oe or 3.142 × 5 × 5 × '*h*' (=78.5 – 78.55) M1 for 1000 ÷ (3.142 × 5 × 5) A1 for 12.7 – 12.8 NB: multiples of π acceptable for M marks
17		$4x - 3 = 2x + 2y$ $2x - 3 = 2y$ $2x = 2y + 3$ $x = y + 1.5$	$x = y + 1.5$	3	M1 for attempt to expand brackets eg $2\times x+2\times y$ or divide through by 2 (each term). M1 for attempt to get x on one side of equation. A1 for $(x =) y + 1.5$, $\frac{2y + 3}{2}$, oe
18			(11, 21)	3	M1 for 5 – 2 or 9 – 3 OR 3 or 6 as long as these are not related to the 3 from *A* or multiple 3 or 9,18 M1 for 2 + 3 × "3" and 3 + 3 × "6" OR for 5 + 2 × "3" and 9 + 2 × "6" OR for 2 + 3 × "3" (=11) and (y=) 2 × '11' – 1 A1 cao SC: B1 if no method shown and answer shows x coordinate as 11 or y coordinate as 21.

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
19			4.6	5	M1 for $AC = \sqrt{(3^2+4^2)}$ (=5) or $DA = \sqrt{(5^2+2^2)}$ M1 for tan BAC = 0.75 oe or (BAC=) 36.8(6) or 36.9 M1 for tan DAC = 0.4 oe or (DAC=) 21.8(0) M1 for $\sqrt{'5'^2+2^2}$ × sin("36.8(6)"+"21.8(0)") or 5.385 × sin 58.7 A1 for 4.59 – 4.61 OR M1 for $AC = \sqrt{3^2+4^2}(=5)$ or $DP = \sqrt{(29 - AP^2)}$ M1 for cos BAC = 0.8 oe or (BAC=) 36.8(6) oe M1 for angle CDP = angle BAC M1 for (DP=) 3 + 2×cos CDP or (AP=) 4 – 2×sin CDP A1 for 4.59 – 4.61
20			0.5, −3	3	M1 for $(2x \pm 1)(x \pm 3)$ M1 for $(2x - 1)(x + 3)$ A1 cao OR M1 for $\frac{-5 \pm \sqrt{5^2 - 4 \times 2 \times -3}}{2 \times 2}$ allow sub. of $c = \pm 3$ M1 for $\frac{-5 \pm \sqrt{49}}{4}$ A1 cao NB: any other method put in review.

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5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
21		$1180.5 \div \frac{4}{3}\pi(6.15)^3$	1.21	4	M1 for 1180 ± 0.5 or 6.2 ± 0.05 M1 for 'max. mass' ÷ 'min. volume' where "min volume" is defined as any expression involving 6.15 M1 for $1180.5 \div \frac{4}{3}\pi(6.15)^3$ A1 for 1.21 – 1.22
22			proof	3	B1 for *AD* = *AB* and *AE* = *AG* B1 for angle *EAB* = angle *DAG* (= 90 + angle *DAE*) B1 (dep on previous B marks) for 2 sides and included angle (SAS) oe
23	(a)		$3\boldsymbol{a} + \boldsymbol{b}$	1	B1 oe
	(b)		$3\mathbf{c}$	4	M1 for writing *QB* as a combination of vectors eg $\frac{1}{2}$ ('3**a** + **b**') + **b** or 3**a** + 2**b** – $\frac{1}{2}$ ('3**a** + **b**') or 2**a** + 2**b** − **c** oe M1 for equating **a** + **b** = 2**c** or writing *PQ* in terms of vectors **a** and **b** eg −**a** + $\frac{1}{2}$ ('3**a** + **b**') or 2**a** + **b** – $\frac{1}{2}$ ('3**a** + **b**') A1 for (*PQ*=) $\frac{1}{2}$**a** + $\frac{1}{2}$**b or** (*QB*=) $\frac{3}{2}$**a** + $\frac{3}{2}$**b** or (*QB*=) 2**c**−**a** + **a** + **c** A1 cao NB: accept equivalent expressions throughout

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		331.705	1	B1 cao
	(b)		179300	1	B1 cao
2			24	4	M1 for 0.15 × 240 (= 36) oe M1 for $\frac{3}{4}$ × 240 (= 180) oe M1 (dep on both prev M1) for 240 – "180" – "36" A1 cao **OR** M1 for 15(%) + 75(%) (= 90(%)) M1 for 100(%) – "90(%)" (= 10(%)) M1 (dep on both prev M1) for " $\frac{10}{100}$ " × 240 oe A1 cao **OR** M1 for 0.15 + 0.75(= 0.9) oe M1 for "0.9" × 240(= 216) oe M1 (dep on both prev M1) for 240 "216" A1 cao **OR** M1 for 0.15 + 0.75(= 0.9) oe M1 for 1 – "0.9"(= 0.1) oe M1 (dep on both prev M1) for "0.1" × 240 oe A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
3			2| 4 7 8 3| 0 3 3 5 7 8 8 4| 1 1 2 4 4 5 Key,eg 4|1 is 4.1(kg)	3	B2 for correct ordered stem and leaf (B1 for fully correct unordered or ordered with one error or omission) B1 (indep) for key (units not required)
4	(a)		$6 + 3t$	1	B1 for $6 + 3t$
	(b)		$6x^2 + 15x$	2	B2 for $6x^2 + 15x$ (B1 for $6x^2$ or $15x$)
	(c)	$m^2 + 10m + 3m + 30$	$m^2 + 13m + 30$	2	M1 for all 4 terms (and no additional terms) correct with or without signs or 3 out of no more than four terms correct with signs A1 for $m^2 + 13m + 30$
5		5|525 5|105 3|21 7	$3 \times 5 \times 5 \times 7$	3	M1 for continual prime factorisation (at least first 2 steps correct) or first two stages of a factor tree correct M1 for fully correct factor tree or list 3, 5, 5, 7 A1 $3 \times 5 \times 5 \times 7$ or $3 \times 5^2 \times 7$

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PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
6			7	3	M1 for 4 ×10 or 40 or $\frac{12+6+15+x}{4}$ or a correct equation M1 for a complete and correct method A1 cao
7	(a)	(4,0) (3, 0) (3, -1) (2, -1) (2, 2) (4, 2)	Correct position	2	B2 for correct shape in correct position (B1 for any incorrect translation of correct shape)
	(b)		Rotation 180° (0,1)	3	B1 for rotation B1 for 180° (ignore direction) B1 for (0, 1) **OR** B1 for enlargement B1 for scale factor -1 B1 for (0, 1) (NB: a combination of transformations gets B0)

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
8		$\frac{20 \times 300}{0.5}$	12000	3	B1 for 20 or 300 used M1 for "20" × "300" or $\frac{"20"}{0.5}$ or $\frac{"300"}{0.5}$, values do not need to be rounded A1 for answer in the range 11200 –13200 SC B3 for 12000 with or without working
9		LCM (80, 50) = 400 Matt 400 ÷ 50 = 8 Dan 400 ÷80 = 5 **OR** 50 = 2 × 5 (× 5) 80 = 2 × 5 (× 2 × 2 × 2)	Matt 8 Dan 5	3	M1 lists multiples of both 80 (seconds) and 50 (seconds) (at least 3 of each but condone errors if intention is clear, can be in minutes and seconds) or use of 400 seconds oe. M1 (dep on M1) for a division of "LCM" by 80 or 50 or counts up "multiples" (implied if one answer is correct or answers reversed) A1 Matt 8 and Dan 5 SC B1 for Matt 7, Dan 4 **OR** M1 for expansion of both 80 and 50 into prime factors. M1 demonstrates that both expansions include 10 oe A1 Matt 8 and Dan 5 SC B1 for Matt 7, Dan 4

PMT

PAPER: 1MA0_1H					
Question		Working	Answer	Mark	Notes
10			1.5	4	M1 for correct expression for perimeter eg. $4 + 3x + x + 6 + 4 + 3x + x + 6$ oe M1 for forming a correct equation eg. $4 + 3x + x + 6 + 4 + 3x + x + 6 = 32$ oe M1 for $8x = 12$ or $12 \div 8$ A1 for 1.5 oe **OR** M1 for correct expression for semi-perimeter eg. $4 + 3x + x + 6$ oe M1 for forming a correct equation eg. $4 + 3x + x + 6 = 16$ oe M1 for $4x = 6$ or $6 \div 4$ A1 for 1.5 oe

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
***11 QWC**		$\frac{30}{24} \times 60 = 75$	Debbie + explanation	4	M1 for reading 24 (mins) and 30 (km) or a pair of other values for Debbie M1 for correct method to calculate speed eg. 30 ÷ 24 oe A1 for 74 – 76 or for 1.2 – 1.3 and 1.1 C1 (dep on M2) for correct conclusion, eg Debbie is fastest from comparison of "74 – 76" with 66 (kph) or "1.2 – 1.3" and 1.1 (km per minute) **OR** M1 for using an appropriate pair of values for Ian's speed eg 66 and 60, 33 and 30, 11 and 10 M1 for pair of values plotted on graph A1 for correct line drawn C1 (dep on M2) for Debbie is fastest from comparison of gradients. **OR** M1 for reading 24 (mins) and 30 (km) or a pair other values for Debbie M1 for Ian's time for same distance or Ian's distance for same time. A1 for a pair of comparable values. C1 (dep on M2) for Debbie is fastest from comparison of comparable values.

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
12		x – 2 -1 0 1 2 3 4 y 4 4.5 5 5.5 6 6.5 7	$y = ½ x + 5$ drawn	3	**(Table of values/calculation of values)** M1 for at least 2 correct attempts to find points by substituting values of x. M1 ft for plotting at least 2 of their points (any points plotted from their table must be plotted correctly) A1 for correct line between x = -2 and x = 4 **(No table of values)** M1 for at least 2 correct points with no more than 2 incorrect points M1 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y = ½ x + 5$ drawn A1 for correct line between x = -2 and x = 4 **(Use of y=mx+c)** M1 for line drawn with gradient 0.5 **OR** line drawn with y intercept at 5 M1 for line drawn with gradient 0.5 **AND** line drawn with y intercept at 5 A1 For correct line between x = -2 and x = 4 SC B2 for a correct line from x = 0 to x = 4
*13 QWC			Yes with explanation	3	M1 for bearing ± 2 ° within overlay M1 for use of scale to show arc within overlay or line drawn from C to ship's course with measurement C1(dep M1) for comparison leading to a suitable conclusion from a correct method

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)	Line joins an empty circle at -2 to a solid circle at 3	diagram	2	B2 cao (B1 for line from -2 to 3)
	(b)	$2x \geq 7$	$x \geq 3.5$	2	M1 for correct method to isolate variable and number terms (condone use of =, >, ≤, or <) or (x =) 3.5 A1 for $x \geq 3.5$ oe as final answer
*Q15 QWC			No + explanation	3	M1 for $500 \times 9 \times 10^{-3}$ oe A1 for 4.5 C1 (dep M1) for correct decision based on comparison of their paper height with 4 **OR** M1 for $4 \div 500$ oe A1 for 0.008 C1 (dep M1) for correct decision based on comparison of their paper thickness with 0.009 **OR** M1 for $4 \div (9 \times 10^{-3})$ oe A1 for 444(.4...) C1 (dep M1) for correct decision based on comparison of their number of sheets of paper with 500
16			£500	3	M1 for 70% = 350 or $\frac{350}{70}$ M1 for $\frac{350}{70} \times 100$ oe A1 cao

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
17			1 hour 45 mins	6	M1 for method to find volume of pond, eg $\frac{1}{2}(1.3 + 0.5) \times 2 \times 1$ (= 1.8) M1 for method to find the volume of water emptied in 30 minutes, eg $1 \times 2 \times 0.2$ (= 0.4), $100 \times 200 \times 20$ (= 400000) A1 for correct rate, eg 0.8 m³/hr, 0.4 m³ in 30 minutes M1 for correct method to find total time taken to empty the pond, eg "1.8" ÷ "0.8" M1 for method to find extra time, eg 2 hrs 15 minutes − 30 minutes A1 for 1.75 hours, $1\frac{3}{4}$ hours, 1 hour 45 mins or 105 mins **OR** M1 for method to find volume of water emptied in 30 minutes,.eg. $1 \times 2 \times 0.2$ (= 0.4), $100 \times 200 \times 20$ (= 400000) M1 for method to work out rate of water loss eg. "0.4" × 2 A1 for correct rate, eg 0.8 m³/hr M1 for correct method to work out remaining volume of water eg. $\frac{1}{2}(1.1 + 0.3) \times 2 \times 1$ (= 1.4) M1 for method to work out time, eg "1.4" ÷ "0.8" A1 for 1.75 hours, $1\frac{3}{4}$ hours, 1 hour 45 mins or 105 mins NB working could be in 3D or in 2D and in metres or cm throughout

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
18		$12x + 21y = 3$ $12x + 40y = 60$ $19y = 57$ $y = 3$ $3x + 10\times 3 = 15$ $3x = -15$ Alternative method $x = \left(\frac{1-7y}{4}\right)$ $3\left(\frac{1-7y}{4}\right) + 10y = 15$ $3 - 21y + 40y = 60$ $19y = 57$ $x = \left(\frac{1-7\times 3}{4}\right)$	$x = -5$, $y = 3$	4	M1 for a correct process to eliminate either x or y or rearrangement of one equation leading to substitution (condone one arithmetic error) A1 for either $x = -5$ or $y = 3$ M1 (dep) for correct substitution of their found value A1 cao
19		– 5, 0.2, 0.5, 1	-5, 5^{-1}, 0.5 , 5^{0}	2	M1 for either 5^{-1} or 5^{0} evaluated correctly A1 for a fully correct list from correct working, accept original numbers or evaluated (SC B1 for one error in position or correct list in reverse order)

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
20			$5x^2$	4	M1 for $4x \times 4x$ M1 for $(2x \times 4x)/2$ or $(2x \times x)/2$ or $(3x \times 4x)/2$ M1(dep M2) for "16 x^2" – "4 x^2" – "x^2" – "6 x^2" A1 for $5x^2$ **OR** M1 for $\sqrt{(2x)^2 + (4x)^2}$ $(= \sqrt{20x^2} = \sqrt{20}\,x)$ M1 for $\sqrt{(x)^2 + (2x)^2}$ $(= \sqrt{5x^2} = \sqrt{5}\,x)$ M1(dep M2) for $\frac{"\sqrt{5}\,x" \times "\sqrt{20}\,x"}{2}$ $(= \frac{\sqrt{100}}{2}\,x^2)$ A1 for $5x^2$
21	(a)	Cf table: 4, 9, 25, 52, 57,60 cf graph	Correct Cf graph	3	B1 Correct cumulative frequencies (may be implied by correct heights on the grid) M1 for at least 5 of "6 points" plotted consistently within each interval A1 for a fully correct CF graph
	(b)(i)		172	3	B1 for 172 or read off at cf = 30 or 30.5 from a cf graph, ft provided M1 is awarded in (a)
	(ii)	IQR = UQ – LQ	12 - 14		M1 for readings from graph at cf = 15 or 15.25 and cf = 45or 45.75 from a cf graph with at least one of LQ or UQ correct from graph (± ½ square). A1ft provided M1 is awarded in (a)

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PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
22			1200 cm^3	4	M1 for 10 × 2 × 2 and 15 × 2 M1 for "40" × "30" A1 for 1200 B1 (indep) for cm^3 OR M1 for 10 × 15 or 2^3 or 8 indicated as scale factor M1 for 10 × 15 × 2 × 2 × 2 A1 for 1200 B1 (indep) for cm^3 SC B2 for 600 cm^3 (B1 for 600)
23		$\frac{4(x+5)}{(x+5)(x-3)}$	$\frac{4}{x-3}$	2	M1 for $(x \pm 5)(x \pm 3)$ A1 for $\frac{4}{x-3}$
24		12 ÷ 10 = 1.2 15 ÷ 5 = 3 13 ÷ 5 = 2.6 18 ÷ 10 = 1.8 3 ÷ 15 = 0.2	Histogram	3	B3 for fully correct histogram (B2 for 4 correct blocks) (B1 for 3 correct blocks) (If B0, SC B1 for correct key eg $1cm^2$ = 2 (calls) Or frequency ÷ class interval for at least 3 frequencies) **NB** Apply the same mark scheme if a different frequency density is used.

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		$a = 4, b = 5$	3	M1 for sight of $(x-4)^2$ M1 for $(x-4)^2 - 16 + 21$ A1 for $a = 4, b = 5$ OR M1 for $x^2 - 2ax + a^2 + b$ M1 for $-2a = -8$ and $a^2 + b = 21$ A1 for $a = 4, b = 5$
	(b)		(4, 5)	1	B1 ft
26		50 1 1 1 50 1 1 1 50	$\frac{126}{720}$	4	M1 for 3 fractions $\frac{a}{10}$, $\frac{b}{9}$, $\frac{c}{8}$ where a < 10, b < 9 and c < 8 M1 for $\frac{7}{10}\times\frac{3}{9}\times\frac{2}{8}$ or $\frac{3}{10}\times\frac{7}{9}\times\frac{2}{8}$ or $\frac{3}{10}\times\frac{2}{9}\times\frac{7}{8}$ $(=\frac{42}{720})$ M1 for $\frac{7}{10}\times\frac{3}{9}\times\frac{2}{8} + \frac{3}{10}\times\frac{7}{9}\times\frac{2}{8} + \frac{3}{10}\times\frac{2}{9}\times\frac{7}{8}$ or $3\times\frac{3}{10}\times\frac{2}{9}\times\frac{7}{8}$ A1 for $\frac{126}{720}$ oe. eg. $\frac{7}{40}$ **Alternative Scheme for With Replacement** M1 for $\frac{7}{10}\times\frac{3}{10}\times\frac{3}{10}$ $(=\frac{63}{1000})$ M1 for $\frac{7}{10}\times\frac{3}{10}\times\frac{3}{10}\times 3$ $(=\frac{189}{1000})$ M0 A0 No further marks

PAPER: 1MA0_1H					
Question		**Working**	**Answer**	**Mark**	**Notes**
27	(a)		**a - b**	1	B1 for **a - b** oe
	(b)		$\frac{2}{5}\mathbf{a} + \frac{3}{5}\mathbf{b}$	3	M1 for a correct vector statement for $\overrightarrow{NR}$ eg. ($\overrightarrow{NR}$ =) $\overrightarrow{NQ} + \overrightarrow{QR}$ or ($\overrightarrow{NR}$ =) $\overrightarrow{NS} + \overrightarrow{SR}$ M1 for $\frac{2}{5}SQ$ (+ QR) or $\frac{3}{5}QS$ (+ SR) (SQ, QR, QS, SR may be written in terms of **a** and **b)** A1 for $\frac{2}{5}(\mathbf{a} - \mathbf{b}) + \mathbf{b}$ oe or $\frac{3}{5}(\mathbf{b} - \mathbf{a}) + \mathbf{a}$ oe
28	(a)		(90, 0)	1	B1 for (90, 0) (condone ($\frac{\pi}{2}$, 0))
	(b)		Correct graph	1	B1 for graph through (0, 2) (90, 0) (180, -2) (270, 0) (360, 2) professional judgement

PMT

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

PAPER: 1MA0_1H			
Question		**Modification**	**Notes**
3		Stem and leaf diagram: Additional horizontal line was inserted in the diagram.	Standard mark scheme
4	(b)	MLP only: *x* changed to *y*.	Standard mark scheme
7	(a) (b)	2cm grid – shape P moved up two squares. 2cm grid. No shading of shapes – x axis -2 and -4 removed as they would obscure shape	Note that the original shape **P** is in a different position Standard mark scheme
10		Braille and MLP *x* changed to *y*.	Standard mark scheme
11		2 cm for 5 on both axes.	Change of scale
12		1.5 cm grid.	Standard mark scheme

PAPER: 1MA0_1H			
Question		**Modification**	**Notes**
13		N line increased to 9 cm. Shading removed. 'Land' and 'Sea' labelled. 037 degrees was changed to 040 degrees.	037° changed to 040°
14		2 cm spaces between numbers.	Standard mark scheme
17	(b)	Model as well as diagram provided. Braille only: 90 degrees written on diagram instead of the right angle sign.	Standard mark scheme
21		Frequency table: numbers changed to 5, 5, 10, 25, 10 and 5. Grid: 1.5 cm for 5 on both axes. Right axis labelled.	Frequency numbers changed to 5, 5, 10, 25, 10, 5 (a) Cumulative frequencies 5, 10, 20, 45, 55, 60 (b) Greater tolerance needed. Median and IQR will be different to those in standard scheme.
22	(b)	Models as well as diagram provided.	Standard mark scheme
24		2cm grid both axes. In the table, the number of calls is changed to 12 14 13 20 6	Number of calls changed to 12, 14, 13, 20, 6 So frequency density will be 1.2, 2.8, 2.6, 2, 0.4
27		vectors 'a' and 'b' in larger font size	Standard mark scheme
28		Size of diagram enlarged. Cross at A changed to a filled-in circle	Standard mark scheme

PMT

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Mark Scheme (Results)

Summer 2016

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Higher (Calculator) Unit 3

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Note that in some cases a correct answer alone will not score marks unless supported by working; these situations are made clear in the mark scheme. Examiners should be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will award marks for the quality of written communication (QWC).
The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labelling conventions.

ii) *select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks; transcription errors may also gain some credit. Send any such responses to review for the Team Leader to consider.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations
Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

12 Parts of questions
Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PMT

PAPER: 5MB3H/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1*			Decision (supported)	3	M1 for correct first step e.g. 15 ÷ 3 M1 for complete method C1 for correct decision with accurate figures
2	(a)		Correct diagram	2	B2 cao (B1 for correct orientation)
	(b)		Enlargement, sf 4, centre (0, 1)	3	B1 for enlargement B1 for scale factor 4 B1 for centre (0, 1)
3			$w = \frac{d+5}{2}$	2	M1 for attempt to add 5 to both sides or divide both sides by 2 as a first step, eg $d + 5 = 2w$ oe or $\frac{d}{2} = w - \frac{5}{2}$ oe A1 for $w = \frac{d+5}{2}$ oe

PMT

PAPER: 5MB3H/01					
Question		Working	Answer	Mark	Notes
4			22.5	4	M1 for $4(x - 8) = 2x + 13$ M1 for expansion of bracket or division of all terms by 4, eg $4x - 32 = 2x + 13$, or $x - 8 = \frac{2x}{4} + \frac{13}{4}$ M1 for isolating x and number terms eg $2x = 45$, $\frac{x}{2} = \frac{45}{4}$ A1 for $\frac{45}{2}$ or 22.5 OR M1 for $(180 - 64) \div 2$ (= 58) M1 for $4(x - 8)$ = "58" or $2x + 13$ = "58" or "58" – 13 (= 45) M1 for isolating x and number terms eg $4x = 90$, $2x = 45$ or "45" ÷ 2 A1 for $\frac{45}{2}$ or 22.5 OR M1 for $64 + 4(x - 8) + 2x + 13$ M1 for $64 + 4(x - 8) + 2x + 13 = 180$ M1 for isolating x and number terms eg $6x = 135$ A1 for $\frac{45}{2}$ or 22.5
5			Correct region shaded	3	M1 for a circle centre M or N (accept arc of sufficient length to define the region) M1 for circle centre M radius 5 cm **and** circle centre N radius 3 cm (accept arc of sufficient length to define the region) A1 for correct region shaded

PAPER: 5MB3H/01					
Question		Working	Answer	Mark	Notes
*6			Conclusion (supported)	4	M1 for $\pi \times 120^2$ (= 45 216 – 45 249) M1 for "$\pi \times 120^2$" ÷ 1800 A1 for 25 – 25.2 C1 ft (dep on M2) for appropriate conclusion from their figures OR M1 for $\pi \times 120^2$ (= 45 216 – 45 249) M1 for 20 × 1800 A1 for 36 000 and 45 216 – 45 249 C1 ft (dep on M2) for appropriate conclusion from their figures OR M1 for $\pi \times 120^2$ (= 45 216 – 45 249) M1 for "$\pi \times 120^2$" ÷ 20 A1 for 2260 – 2263 C1 ft (dep on M2) for appropriate conclusion from their figures OR M1 for 1800 × 20 M1 for 36 000 ÷ π (=11 457 – 11 465) A1 for 107(.0…) C1 ft (dep on M2) for appropriate conclusion from their figures
7			161.50	5	M2 for a correct method to decrease 6720 by 20%, eg 6720 × 0.8 (= 5376) or 6720 × 0.2 (= 1344 and 6720 – 1344 (= 5376)) (M1 for a correct method to find 20% of 6720 eg 6720 × 0.2 or $\frac{20}{100} \times 6720$ (= 1344)) M1 for subtracting 1500 (= 3876) after a percentage calculation M1 "3876" ÷ 24 after the subtraction of 1500 A1 for 161.5(0)

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PAPER: 5MB3H/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
8		3 42 3.1 45.(291) 3.2 48.(768) 3.3 52.(437) 3.4 56.(304) 3.5 60.(375) 3.6 64.(656) 3.7 69.(153) 3.8 73.(872) 3.9 78.(819) 4 84 3.71 69.6(14811) 3.72 70.(078848) 3.73 70.5(45117) 3.74 71.(013624) 3.75 71.4(84375)	3.7	4	B2 for a trial between 3 and 4 exclusive (B1 for a trial at 3 or 4) B1 for a different trial of $3.7 < x \leq 3.75$ B1 (dep on at least one previous B1) for 3.7 NB. Trials should be evaluated to at least 2 sf truncated or rounded for values of x correct to 1 decimal place. Trials should be evaluated to at least 1 dp truncated or rounded for values of x correct to 2dp. **NB** No working scores 0 marks even if answer is correct
9			618	4	M1 for a method to find an area which is part of the cross section M1 (dep) for a complete method to find the total area of the cross section M1 (dep M1) for their cross sectional area × 12 A1 cao **OR** M1 for a method to find the volume of cuboid, 8 × 8 × 12 (= 768) M1 for a method to find the volume of the triangular prism, ½ ×5 × 5 × 12(= 150) M1 (dep M2) for a complete method for the volume of the prism A1 cao

5MB3H_01					
Question		Working	Answer	Mark	Notes
10	(a)		15.2	3	M1 for $12.7^2 + 8.3^2$ or 161.29 + 68.89 or 230.18 M1 for √"$(12.7^2 + 8.3^2)$" or √"161.29 + 68.89" or $\sqrt{230.18}$ A1 for 15.2 or 15.17(168…)
	(b)		16.1	3	M1 for $\sin 40° = \frac{DE}{25}$ oe or $\frac{DE}{\sin 40} = \frac{25}{\sin 90}$ oe M1 for 25 sin 40° A1 for 16.1 or 16.06(969…)
11	(a)		4.081	2	M1 for 8.875 or $\frac{71}{8}$ or 2.979…or 4.08 A1 for 4.081 or 4.0809(5…)…
	(b)		4×10^{-3}	2	M1 for 4×10^n, $n \neq -3$ or $a \times 10^{-3}$, $a \neq 4$ or 0.004 or 0.4×10^{-2} or 1/250 A1 cao
12			$x < 2$	2	M1 for an attempt to isolate x and number terms or multiply all terms by 2, or for $\frac{3}{2}x < 3$ or $-\frac{3}{2}x < -3$ or $x = 2$ A1 cao
13	(a)		0, 6, 4, –6	2	B2 for all values correct (B1 for any one value correct)
	(b)		Graph drawn	2	M1 ft (provided B1 in (a) for at least 6 points plotted correctly from their table A1 cao for correct curve drawn from (–4, –6) to (3, –6)
	(c)		1.5 to 1.6 and –2.5 to –2.6	2	M1 for correct use $y = 2$ (may be implied by one correct estimate) or correct use of formula. A1 for 1.5 to 1.6 and –2.5 to –2.6

5MB3H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14*		Sher Yas **Old 19300 12560** New 20265 13502 **Inc 965 942**	Correct comparison (supported)	3	M1 for a correct method to calculate the population at the beginning of the 10 year period for at least one place. eg $\frac{20265}{1.05}$ (= 19 300) oe or $\frac{13502}{1.075}$ (= 12 560) oe A1 for 965 (Sherbury) **and** 942(Yaston) C1 (dep on M1) ft for statement comparing increases leading to conclusion based on two comparable amounts eg increase in Sherbury is greater than increase in Yaston
15		$20x + 10y = 35$ $6x - 10y = -48$ $x = -\frac{1}{2}$ $y = \frac{9}{2}$ OR $12x + 6y = 21$ $12x - 20y = -96$ $26y = 117$ $y = \frac{9}{2}$ $x = -\frac{1}{2}$	$-\frac{1}{2}, \frac{9}{2}$	4	M1 for a correct process to eliminate either variable (condone one arithmetic error) A1 cao for either x or y M1 (dep on M1) for correct substitution of found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao OR M1 for full method to rearrange and substitute to eliminate either variable (condone one arithmetic error) A1 cao for either x or y M1 (dep on M1) for correct substitution of found value into one of the equations or appropriate method after starting again (condone one arithmetic error) A1 cao **NB** Trial and improvement methods score 0 marks unless both x and y are correct
16			226	2	M1 for angle $ABC = 180 - 67$ (= 113) A1 cao OR M1 for obtuse angle $AOC = 2 \times 67$ (= 134) A1 cao

5MB3H_01					
Question		Working	Answer	Mark	Notes
17			– 2.82, 19.82	3	M1 for $\frac{--17 \pm \sqrt{(-17)^2 - 4\times1\times-56}}{2\times1}$ (condone one sign error) or $\left(x - \frac{17}{2}\right)^2$ oe M1 for $\frac{17 \pm \sqrt{513}}{2}$ or for method leading to $\frac{17}{2} \pm \sqrt{\frac{513}{4}}$ oe A1 for answers in the range 19.82 to 19.825; – 2.82 to –2.825
18			21.2	4	M1 for correct use of sine rule to find *AB* or *BC*, eg $\frac{6}{\sin 25} = \frac{AB}{\sin 120}$ or $\frac{6}{\sin 25} = \frac{BC}{\sin(180-120-25)}$ M1 for (*AB* =) $\frac{6}{\sin 25} \times \sin 120$ (= 12.2(951…)) or (*BC* =) $\frac{6}{\sin 25} \times \sin 35$ (= 8.1(431…) M1(dep M2) for method to find area, eg 0.5 × 6 × "*AB*" sin35 or 0.5 × 6 × "*BC*" sin 120 A1 for answer in the range 21.1 – 21.2 OR (with perpendicular from *A* meeting *BC* extended at a point *X*) M1 for method to find *AX* M1 for method to find *BX* M1(dep M2) for 0.5 × "*AX*" × "*BC*" A1 for answer in the range 21.1 – 21.2
*19			0.38 because the LB and UB agree to that number of figures	5	B1 for 10.75 or 10.85 or 10.84999… B1 for 75.055 or 75.065 or 75.064999… M1 for $\sqrt{\frac{10.85}{75.055}}$ as UB **OR** $\sqrt{\frac{10.75}{75.065}}$ as LB A1 (dep on all previous marks) for both 0.3802… and 0.3784 must clearly come from working with correct values C1 for 0.38 from 0.3784… and 0.3802 … **and** "both LB and UB round to 0.38" **NB** An answer of 038(932….) without working scores no marks

PMT

5MB3H_01					
Question		Working	**Answer**	**Mark**	**Notes**
20			7.35	3	M1 for $y \propto \frac{1}{\sqrt{x}}$ or $y = \frac{k}{\sqrt{x}}$ or $9 = \frac{k}{\sqrt{4}}$ M1 for $k = 9\sqrt{4}$ (=18) A1 for 7.35 or 7.348…
*21			$\frac{2}{3}$ (7**a** + 3**b**) and correct conclusion	4	M1 for correct vector for $\overrightarrow{OY}$, or $\overrightarrow{AP}$ eg $(\overrightarrow{OY}) = \overrightarrow{OA} + \overrightarrow{AY}$, or $\overrightarrow{OY} = \overrightarrow{OA} + \frac{2}{3}\overrightarrow{AP}$ may include terms in **a** and **b,** eg. 6**a** + $\overrightarrow{AY}$, 4**b** + 4**a** – **b** + $\overrightarrow{PY}$ or $\overrightarrow{AP} = \overrightarrow{AO} + \overrightarrow{OB} + \overrightarrow{BP}$ or –6**a** + 4**b** + 4**a** – **b** or – 2**a** + 3**b** M1 for $(\overrightarrow{AY}) = \frac{2}{3}\overrightarrow{AP}$ or ⅔(–6**a** + 4**b** + 4**a** – **b**) or ⅔(–2**a** + 3**b**) or $(\overrightarrow{PY} = \frac{1}{3}\overrightarrow{PA}$ or ⅓(– 4**a** + **b** – 4**b** + 6**a**) or ⅓(2**a** – 3**b**) M1 for correct expression for $\overrightarrow{OY}$ in terms of **a** and **b,** eg $\frac{14}{3}$ **a** + 2**b** C1 for $\frac{2}{3}$ (7**a** + 3**b**) and "$\overrightarrow{OY}$ is parallel to the vector 7**a** +3**b**" **oe**

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5°
Measurements of length: ±5 mm

PAPER: 5MB3H_01			
Question		**Modification**	**Notes**
Q2	(a)	Grid enlarged. Shading changed to dotty shading. Labels added to shapes. Image labelled shape A. Rotation given and labelled shape B. Question changed to 'Describe fully the single transformation which maps shape A to shape B. One row top and bottom, one column left and right has been removed. Three answer lines given.	2 cao (B1 for correct orientation in third quadrant or correct quarter turn)
Q2	(b)	Grid enlarged. Shading changed to dotty shading. Labels added next to the triangles 'triangle P' and 'triangle Q'. One column removed from the left.	B1 for enlargement B1 for scale factor 4 B1 for centre (0, 1)

PAPER: 5MB3H_01			
Question		**Modification**	**Notes**
Q4		Diagram enlarged. MLP only – x changed to y. Braille only – measurements given in the text.	M1 for $4(x - 8) = 2x + 13$ M1 for expansion of bracket or division of all terms by 4, eg $4x - 32 = 2x + 13$, $x - 8 = 2x/4 + 13/4$ M1 for isolating x and number terms eg $2x = 45$, $x/2 = 45/4$ A1 for 45/2 or 22.5 OR M1 for $(180 - 64) \div 2$ (= 58) M1 for $4(x - 8) = 58$ or $2x + 13 = 58$ M1 for isolating x and number terms eg $4x = 90$, $2x = 45$ A1 for 45/2 or 22.5 OR M1 for $64 + 4(x - 8) + 2x + 13$ M1 for $64 + 4(x - 8) + 2x + 13 = 180$ M1 for isolating x and number terms eg $6x = 135$ A1 for 45/2 or 22.5
Q5		Diagram kept the same size as original. Scale moved above the diagram and also put in the question paper.	B1 for circle centre M radius 5 cm B1 for circle centre N radius 3 cm B1 for correct region shaded

PMT

PAPER: 5MB3H_01			
Question		**Modification**	**Notes**
Q6		Diagram enlarged. Cross changed to a filled in circle. Arrow heads removed.	M1 for $\pi \times 120^2$ (= 45238….) M1 for "$\pi \times 120^2$" ÷ 1800 A1 for 25.0 – 25.2 C1 for "surface is large enough as 25 > 20" oe OR M1 for $\pi \times 120^2$ (= 45238….) M1 for 20 × 1800 A1 for 36000 C1 for "surface is large enough as 36000 < 45238..." oe OR M1 for $\pi \times r^2 = 1800 \times 20$ M1 for 36000 ÷ π (=11459..) A1 for 107.0… C1 for "surface is large enough as 107…< 120" oe
Q9		Model provided for all candidates. Diagram enlarged and provided for MLP.	M1 for a method to find an area which is part of the cross section M1 (dep) for a complete method to find the total area of the cross section M1 (dep M2) for a complete method for the volume of the prism A1 cao OR M1 for a method to find the volume of cuboid, 8 × 8 × 12 M1 for a method to find the volume of the triangular prism M1 (depM2) for a complete method for the volume of the prism A1 cao

PMT

PAPER: 5MB3H_01			
Question		**Modification**	**Notes**
Q10	(a)	Diagram enlarged. Braille only: measurements given in the text.	M1 for $12.7^2 + 8.3^2$ or $161.29 + 68.89$ or 230.18 M1 for $\sqrt{161.29 + 68.89}$ or $\sqrt{230.18}$ A1 for 15.2 or 15.17(168…)
Q10	(b)	Diagram enlarged. Braille only – measurements given in the text.	M1 for $\sin 40° = \frac{DE}{25}$ oe M1 for $25 \sin 40°$ A1 for 16.1 or 16.06(969…)
Q13	(a)	Wording added 'There are four spaces to fill.'	B2 for all values correct (B1 for any one value correct)
Q13	(b)	Grid enlarged.	M1 ft for at least 6 points plotted correctly from their table A1 cao for correct curve drawn from (–4, –6) to (3, –6)
Q16		Diagram enlarged. Dot added at centre.	M1 for angle ABC = 180 – 67 (= 113) A1 cao OR M1 for obtuse angle AOC = 2 × 67 (= 134) A1 cao

PMT

PAPER: 5MB3H_01			
Question		**Modification**	**Notes**
Q18		Diagram enlarged.	M1 for correct use of sine rule to find *AB* or *BC*, eg $\frac{6}{\sin 25} = \frac{AB}{\sin 120}$ M1 for (*AB* =) $\frac{6}{\sin 25} \times \sin 120$ or (*BC* =) $\frac{6}{\sin 25} \times \sin 35$ M1(dep M2) for method to find area, eg 0.5×6×*AB*sin35 or 0.5×6×*BC* sin 120 A1 for answer in the range 21.1 – 21.2 OR (with perpendicular from *A* meeting *BC* extended at a point *X*) M1 for method to find *AX* M1 for method to find *BX* M1(dep M2) for 0.5 × "*AX*" × "*BC*" A1 for answer in the range 21.1 – 21.2
Q21		Diagram enlarged.	M1 for correct vector for $\overrightarrow{OY}$, eg $(\overrightarrow{OY}) = \overrightarrow{OA} + \overrightarrow{AY}$, may include terms in **a** and **b,** eg. 6**a** + $\overrightarrow{AY}$, 4**b** + 4**a** – **b** + $\overrightarrow{PY}$ M1 for ($\overrightarrow{AY}$ =) $\frac{2}{3}\vec{A}P$ or ($\overrightarrow{PY}$ =) $\frac{1}{3}\overrightarrow{PA}$ M1 for correct expression for $\overrightarrow{OY}$ in terms of **a** and **b,** eg $\frac{14}{3}$**a** + 2**b** C1 for $\frac{2}{3}$(7**a** + 3**b)** and "$\overrightarrow{OY}$ is parallel to the vector 7**a** +3**b" oe**

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Question 23

This question was accessible to and discriminated well between the most able students sitting this paper. Students who had a good understanding of bearings together with applications of the sine rule and cosine rule were able to produce an accurate and concise solution to the problem. Of those students who gained partial credit for their attempts, many were only able to score either one mark for a correct process to find the size of angle ABC or two marks for getting as far as finding the length of AC. Some students who got as far as finding the size of angle BAC successfully gave this as their final answer. Finding the bearing of A from C instead of the bearing from C from A was also seen quite frequently.

Summary

Based on their performance on this paper, students should:

- check working for careless errors and to see that the answer given was specifically required by the question.
- practise problems involving the surface areas of solids.
- practise expanding brackets and collecting terms especially with quadratic functions involving fractions.
- ensure a good understanding of multipliers in problems concerning percentages
- practise solving quadratic inequalities.

Question 8

It was rare to see a fully correct solution to this question. Bearings remains a topic which many students find difficult to understand. Those students able to correctly draw a bearing of 070° usually went on to score well. The ability to use distance = speed × time did enable many students to gain at least one mark for a distance of 18 km and often an additional mark for correct use of scale. When a correct position for Q was found, the distance from L was usually correct but the bearing of Q from L, a reflex angle, was usually not correct.

Question 6

Very few students were able to access this question. Despite it being only grade 5 this is a topic area students seem to really struggle with. There was credit given for a suitable diagram, but very few were able to provide one, showing very limited understanding of bearings in general. In most cases, they drew the two points the wrong way round, or were unable to correctly mark on the reverse bearing.

Question 11

There were very few fully correct answers to this question. Lower attaining students did not appreciate the need to use 50^2 or 100^2 in one way or another to take into account area and unit conversions. These students often restricted their response to working out

$\frac{48\times50}{100}$, resulting in the answer 24. However, examiners were able to give partial credit to the relatively small proportion of students who realised the need to use $1\ m^2 = 10\ 000\ cm^2$, often expressed in the form of dividing by 100 twice. Very few students identified the need to use the scale factor of 2500 (or 50 × 50). Some students successfully chose dimensions for the room on the plan, for example 8 cm and 6 cm then converted these to metres before recalculating the area.

Question 8

There were two processes in this question, a use of scale and a use of the formula for the area of a triangle. The more successful students used the scale first on *RQ* to get a drawing length of 8 cm. This was then used correctly with the area of the scale drawing to find *PQ*, which was then scaled back up to get the real length.
The other method was to scale up the area first, and then use the real length of *RQ* to find the real length of *PQ*. This method was the better of the two as it seems to have less steps.

However, most who attempted this method only multiplied the area by the length scale factor of 5, not the area scale factor of 5^2, and as a result could only gain the one mark. It was common to see a correct scaling of 8 for the length together with an incorrect scaling of 140 for the area, and this was considered to be a choice of methods.

Question 22

The final question required students to prove that two tangents from a fixed point are equal in length. Most attempted this using congruency, with varying degrees of success. As it was a proof, it required reasons to be given at each stage, and although a good number knew the facts, they did not give correct, or complete reasons and struggled to gain any credit. It is important again that students practise stating the geometric properties and reasons.
There was an alternative method seen using isosceles triangles, and this too was able to gain credit when complete reasons were given. When this method was used it was common for the marks to be lost for writing only isosceles rather than isosceles triangle.
Alternate segment theorem was also a possible approach and was an efficient method. Other errors include claiming that OP bisected the angle with no justification for this, describing the relationship without actually stating that, e.g. $OA = OB$.

Summary

Based on the performance on this paper, students should:

- Ensure they know how and when to use a calculator efficiently, but not to forget manual methods. Use of brackets and edit function will help with substitution on a calculator.
- Practise articulating their mathematics in verbal discussions to aid them in written responses.
- Use tables and diagrams to extract information from a question so they can better navigate through the problem.
- Know the relationships between volume, area and length scale factors.
- Provide unambiguous explanation whenever required by the question.
- Cross out any work they do not wish the examiners to mark, leaving one clear solution.
- Whenever possible use accurate figures without prematurely rounding or truncating in presenting work.