

GCSE

Edexcel GCSE

Mathematics A 1387

Summer 2005

Mark scheme

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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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 as 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 centimetres, cm millilitres, ml, cm ³	3	B1 oe spelling B1 oe spelling 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

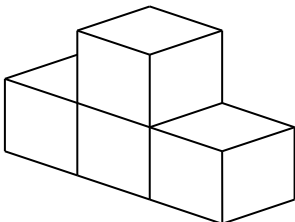
Paper 5521/01																																																					
No	Working	Answer	Mark	Notes																																																	
4	<div><div><div><div>286</div><div>43</div><div>858</div><div>11440</div><div>12298</div></div><div><div>43</div><div>286</div><div>258</div><div>3440</div><div>8600</div><div>12298</div></div></div><div><div>286×40=1140</div><div>286×3=858</div><div>1140+858=12298</div></div></div> <div><table><tr><td>x</td><td>40</td><td>3</td><td></td></tr><tr><td>200</td><td>8000</td><td>600</td><td>8600</td></tr><tr><td>80</td><td>3200</td><td>240</td><td>3440</td></tr><tr><td>6</td><td>240</td><td>18</td><td>258</td></tr><tr><td></td><td></td><td></td><td>12298</td></tr></table></div> <div><table><tr><td></td><td>2</td><td>8</td><td>6</td><td></td></tr><tr><td>1</td><td>0</td><td>8</td><td>3</td><td>2</td><td>2</td><td>4</td><td>4</td></tr><tr><td>2</td><td>0</td><td>6</td><td>2</td><td>4</td><td>1</td><td>8</td><td>3</td></tr><tr><td></td><td>2</td><td>9</td><td>8</td><td></td><td></td><td></td><td></td></tr></table></div>	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
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																																																		
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) (b) (c) (d) (e)(i) (ii)	April & May Daffodil Feb Crocus $\frac{1}{5}$ × from 56 mm to 64 mm from 0	1 1 1 1 2	B1 for both B1 B1 B1 B1 for $\frac{1}{5}$ oe B1 A single mark on the line, between 56 mm and 64 mm measured from end 0
7	(a) (b) (c) (d) (e)	$\frac{40}{100}$ 0.98 7 500 000 25 60	2 1 1 1 1	B2 for $\frac{2}{5}$ B1 for $\frac{40}{100}$ or $\frac{4}{10}$ or $\frac{20}{50}$ or $\frac{8}{20}$ B1 cao B1 cao B1 cao B1 cao

Paper 5521/01				
No	Working	Answer	Mark	Notes
8	(a)(i) (ii) (b)	(0, 2) (4, 1) (2, 1½) marked	2 1	B1 cao B1 cao B1 Allow 2mm tolerance from (2, 1½)
9	(a) (b) (c)	2.40 2.00 1.25	1 2 2	B1 cao could be indicated on the diagram 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 M1 for 1.00 ÷ 0.8 or 2.50 ÷ 2 or 125 or appropriate combination eg 1 + ½ × 0.50 A1 cao
10	(a) (b) (c)	hexagon Sum of angles at a point is 360° 136	1 2 2	B1 Condone spelling error 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) M1 30×4 + 8×2 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	3	M1 for $33.56 \div 4$ oe eg $3356 \div 4$, 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 $5.5 < \text{Area} \leq 7$)
	(b)	See diagram	2	then B1 (indep) for cm^2 with or without numerical answer 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)	$(4 + 3) \times 10$	2	M1 for $(4 + 3) \times 10$ A1 cao
	(b)	$120 \div 10 - 3$	2	M1 for $\frac{120}{10}$ or 12 seen eg $12 \times 10 = 120$ A1 cao
	(c)	$C = 10(n + 3)$	3	B3 for $C = 10(n + 3)$ oe such as $C = (n + 3) \times 10$ (B2 for correct RHS or $C = n + 3 \times 10$, $C = 10n + 3$ oe B1 for $C =$ some other linear expression in n or for $n + 3 \times 10$, $10n + 3$ etc) Note: $C = n$ scores no marks
15		<div>11 13</div> <div>16 8</div> <div> 21</div>	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	$\frac{600}{3 \times 10}$ or $\frac{640}{3.2 \times 10}$	$20-21\frac{1}{3}$	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 $20-21\frac{1}{3}$ Note: 20.3125 scores M0 A0
21 (a)		Points plotted	1	B1 ± 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 ± 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)	$4 \times 3 - 2 \times 1$ $12 - 2$	10	3	M1 for $3 \times 4 (=12)$ or 1×2 or attempt to divide diagram up into rectangles M1 “12”– “2” or sum of areas of rectangles A1 cao
(b)(i)	$\frac{10}{100} \times 680$ or $680 \div 10$ $680 + 68$	748	5	M1 $\frac{10}{100} \times 680$ or $680 \div 10$ or 68 seen M1 (dep) $680 + “68”$ or M2 for 680×1.10 A1 cao
(ii)	“748” $\div 50$ or 14.96	15		M1 For “748” $\div 50$ or 14.96 Accept “748” rounded up or down to next 50 followed by $\div 50$ 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 IIII 8 Chicken III 3 Bovril IIII 5 S & Vin IIII 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	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 \pm half graduation	
	(d)	Arrow at 6.7	1	B1 allow \pm 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 × 25 ÷ 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) (ii) (b)	143° Obtuse Accurate drawing	2 1	B1 for 143 ($\pm 2^\circ$) B1 for obtuse (ignore spelling) B1 for accurate drawing $\pm 2\text{mm}$
7	(a)(i) (ii) (b) (c) (d)	5 23 14, 17	2 1 1 2	B1 cao B1 cao B1 for explaining a suitable method B1 for a correct diagram B2 cao for both (B1 for one only ft from their 14)
8	(a) (b) (c) (d)	90 540 Jupiter - 230	1 1 1 1	B1 accept -90 B1 accept -540 B1 accept -150 B1 cao

Paper 5521/02				
No	Working	Answer	Mark	Notes
9 (a)	$2658 - 2430 = 228$ $"228" \times 32$	72.96	4	M1 $2658 - 2430$ A1 228 M1 $"228" \times 32$ or $"228" \times 0.32$ 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)		80	2	B1 for 80 (± 1)
(ii)		125		B1 125 (± 3)

Paper 5521/02				
No	Working	Answer	Mark	Notes
10 (a) (b)	Height of man \times "2.5"	1.5 – 2.0 3 – 6	1 3	B1 for height between 1.5m – 2.0m inclusive 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 \div 3 = 14	14	2	M1 for – 19 or 42 seen A1 cao
12 (a) (b)	4+5+5+5+4+3+2+1+4+5 = 38 mean = 38 \div 10 = 3.8	5 3.8	1 2	B1 M1 for attempt to add and \div 10 or 3.7 or 3.9 seen A1 for 3.8 SC B1 for 33.5 seen
13 (a) (b)		3x x - 9	1 1	B1 cao Accept $3 \times x$, $x3$, $x \times 3$, $x + x + x$ B1 for $x - 9$ cao
14 (a) (b)	14.44 – 8.660254038	5.77974(...) 6	2 1	M1 for 14.44 seen or 8.66(...) or 5.7 or 5.8 or better rounded or truncated A1 cao B1 ft
15	15 \div 24	62.5	2	M1 for 15 \div 24 or 1500 \div 24 or sight of digits 625 A1 cao
16	2.10 \times 450	945	2	M1 for digits 210 \times 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° \div 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° \div 18 or 20 seen or implied)

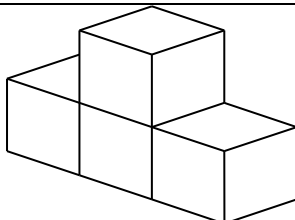
Paper 5521/02				
No	Working	Answer	Mark	Notes
19	(a)	Correct plane	2	B2 for a correct plane defined by showing at least 2 lines. (B1 for a line of symmetry on one face)
	(b)	Correct net	2	B2 cao (B1 for 2 equilateral triangles joined appropriately to at least one rectangle or for 1 equilateral triangle joined appropriately to one of 3 rectangles)
	(c)	Correct drawing	2	B1 for two extra sides of length 6cm (± 2 mm) 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)	$4x+8$	2	M1 for attempting to add $x, x+4, x, x+4$ may be implied by $4x+a$ ($a>0$)
	(b)	15.5	3	A1 for $4x+8$ or $4(x+2)$ M1 for " $4x+8$ " = 54 A1 cao for 11.5 seen B1 ft for " 11.5 " + 4
22		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)	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 $7 \times 10\ 000$ or $7 \times 100 \times 100$ A1 cao
25		$5.40 \div 3 \times 7$	12.60	3	M1 for $5.40 \div 3$ or sight of 1.8 M1 dep for “1.80” $\times 7$ A1 for 12.6 or equivalent
26		$7.60 \times \frac{17.5}{100} = 1.33$ $7.60 + 1.33 = 8.93$ $1650 \times “8.93”$	£14 734.50	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 $1650 \times “8.93”$ or digits 147345 seen A1 cao Accept 14734.5 Alternative M1 for $1650 \times 7.6(0)$ 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 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 $\neq 1$ or 2.
2 (a)		$\begin{array}{cc} 11 & 13 \\ 16 & 8 \\ & 21 \end{array}$	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 \times
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 $x < 90^\circ$ SC: B1 for answer from "60" + 90 if $x < 90^\circ$

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

Paper 5523/03				
No	Working	Answer	Mark	Notes
7	$ \begin{array}{r} 679 \\ 28 \\ \hline 5432 \\ 13580 \\ \hline 19012 \end{array} $ or $ \begin{array}{r} 28 \\ 679 \\ \hline 252 \\ 1960 \\ \hline 16800 \\ 19012 \end{array} $ or $ \begin{array}{ccccc} & & 6 & & 7 & & 9 & & \\ & & & & & & & & \\ 1 & & \begin{array}{ c c c } \hline 1 & 1 & 1 \\ \hline & 2 & 4 & 8 \\ \hline 4 & 5 & 7 \\ \hline & 8 & 6 & 2 \end{array} & & 2 & & \\ 9 & & & & & & 8 & & \\ & & 0 & & 1 & & 2 & & \end{array} $	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) (b) (c) (d)	Points plotted positive Line of best fit approx 1.65	1 1 1 1	B1 ± 1 full (2mm) square B1 cao B1 must pass through (42.5, 1.45), (42.5, 1.55) AND (67.5, 1.75), (67.5, 1.85) 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	$\frac{600}{3 \times 10}$ or $\frac{640}{3.2 \times 10}$	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) (b)	correct reflection reflection in $y = x$	2 2	B2 (B1 reflection in line other than $x=3$) B2 cao Accept the word “reflected” (B1 any statement including the word “reflection”)
15	(a)(i) (ii) (b)	5^6 5^3 $x = 7$ $y = 3$	1 1 3	B1 accept 15125, 5^{4+2} B1 accept 125, 5^{9-6} 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	1 st aspect: One question with time period (eg each night); ignore other questions. 2 nd aspect: Response list (at least two), not overlapping.* 3 rd 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 $\frac{2 \times 3}{3 \times 4}$ 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 (<i>recurring</i>)
19	$2 \times \frac{1}{2} \times 6 \times 8$ or 48 $8 \times 9 + 6 \times 9 + 10 \times 9$ or $72 + 54 + 90$	264 cm^2	4	M1 attempt to find the area of one face; $\frac{1}{2} \times 6 \times 8$ 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	<table border="1"><tr><td></td><td>$\sqrt{\quad}$</td><td></td><td></td><td></td><td>$\sqrt{\quad}$</td><td>$\sqrt{\quad}$</td></tr></table>				$\sqrt{\quad}$				$\sqrt{\quad}$	$\sqrt{\quad}$	$\frac{\pi ab^3}{3d}$ $3(c+d)^3$ $3\pi bc^2$	3	B3 (B1 for each one correct) Nb –B1 for each of the 4 th ,5 th ,6 th tick
	$\sqrt{\quad}$				$\sqrt{\quad}$	$\sqrt{\quad}$							
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)				$(-12) - 4 - 2$	3	B3 for all correct [(B1 for each one correct)						
	(b)				(0)8 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 $y = -2x + 5$ oe (eg $y = \frac{-6}{3}x + 5$) (B1 for $y = mx + 5$ or , $-2x+5$ or $y = -2x + c$)
26	$360 - 90 - 90 = 150$	150	2	B1 accept 150 or 210
(a)(i)				B1 for angle at the centre is twice the angle at the circumference
(ii)		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 $180 - (a)$
(b)				

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(± 1) B1 cao for 15(± 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) (b) $4x + 8 = 54$ $4x = 46$ $x = 11.5$ Length = "11.5" + 4	$4x + 8$ 15.5	2 3	M1 for attempting to add $x + 4, x, x + 4, x$ may be implied by $4x + a, a > 0$ A1 for $4x + 8$ or $4(x + 2)$ 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 " $\times 7$ A1 for 12.6 or equivalent

Paper 5523/04				
No	Working	Answer	Mark	Notes
14	$7.60 \times \frac{17.5}{100} = 1.33$ $7.60 + 1.33 = 8.93$ $1650 \times "8.93"$	£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 $1650 \times "8.93"$ 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	<p>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 $80 \times 60 \times 60$ <u>and</u> 285×1000</p> <p>(M1 for $285 \div 60 \div 60$ or $0.079(\dots)$ 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)</p> <p>A1 for 288 or $79.(\dots)$ or for two correctly calculated comparable values e.g 288000 and 285000</p>
16 (a)	$4x + 12 = 6$ $4x = -6$	-1.5	3	<p>B1 for $4x + 12$ or $x + 3 = \frac{6}{4}$</p> <p>M1 for a correct re-arrangement of their 3 terms to isolate $4x$ or x</p> <p>A1 for -1.5 oe</p>
(b)	$v - u = 5t$	$\frac{v - u}{5}$	2	<p>M1 for isolating $\pm 5t$ or $\pm t$ or for dividing through by 5</p> <p>A1 oe</p>

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) $36 \div (7+3+2)$ $"3" \times 7$	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 $0.515 \times "91.5"$ 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 × 10)+(3 × 15)+(5 × 30)+(7 × 35)+ (9 × 25)+(11 × 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 1 st 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)

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) $\tan x = \frac{1.9}{3.2}$ $x = \tan^{-1}\left(\frac{1.9}{3.2}\right) = 30.7$ (b) $90 + "30.7"$	30.7 121	3 1	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 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 $x^2, -4x, 7x, -28$)
	(b)		$y^4 + 2y^2$	2	A1 cao B2 cao
	(c)		$p(p+6)$	2	B1 for y^4 or $2y^2$ 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 $3x(\dots)$)
2			question + response boxes oe	2	1 st aspect: One question with time period (eg each night); ignore other questions. 2 nd aspect: Response list (at least two), not overlapping.* 3 rd 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)	$\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$	2	M1 for $\frac{6}{12}$ or $\frac{3}{6}$ or $\frac{2 \times 3}{3 \times 4}$ A1 accept 0.5
	(b)	$1+2+\frac{8}{12}+\frac{9}{12}$	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 (<i>recurring</i>)
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 $x - y = 4$	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	$2 \times \frac{1}{2} \times 6 \times 8$ or 48 $8 \times 9 + 6 \times 9 + 10 \times 9$ or 72 +54 + 90	264 cm ²	4	M1 attempt to find the area of one face; $\frac{1}{2} \times 6 \times 8$ 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	<table border="1"><tr><td></td><td>$\sqrt{\quad}$</td><td></td><td></td><td></td><td>$\sqrt{\quad}$</td><td>$\sqrt{\quad}$</td></tr></table>		$\sqrt{\quad}$				$\sqrt{\quad}$	$\sqrt{\quad}$	$\frac{\pi ab^3}{3d}$ $3(c+d)^3$ $3\pi bc^2$	3	B3 (B1 for each one correct) Nb –B1 for each of the 4 th , 5 th , 6 th tick
	$\sqrt{\quad}$				$\sqrt{\quad}$	$\sqrt{\quad}$					
9	(a) $x + 0.3 + 0.2 + x = 1$ (b) 0.3×200	0.25 60	2 2	M1 for $x + 0.3 + 0.2 + x = 1$ oe, or $0.5 \div 2$ A1 oe M1 0.3×200 A1 cao Accept 60 out of 200 (in words) SC B1 for $\frac{60}{200}$							
10	(a) (b)	$(-12) - 4 - 2$ (0)8 5 points plotted accurately points joined with smooth curve	3 2	B3 for all correct [(B1 for each one correct) 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 $2^3 \times 5$ or $2 \times 2 \times 2 \times 5$) 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 $y = -2x + 5$ oe (eg $y = \frac{-6}{3}x + 5$) (B1 for $y = mx + 5$ or , $-2x + 5$ or $y = -2x + c$)
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)	$n = 21 \times 4$ or $\frac{1}{6} : \frac{1}{4}$ oe $\frac{1}{6} \times 84$ 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 $21 \times 4 (=84)$ or $\frac{21}{3} \times 2$ A1 for 14 cao SC: B2 for 63 seen in fraction or ratio

Paper 5525/05				
No	Working	Answer	Mark	Notes
14	(a)(i) (ii) (b) 360 – 90 – 90 – "150" or 180 – "150"	150 30	2 3	B1 accept 150 or 210 B1 for angle at the centre is twice the angle at the circumference 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) SC: 180 – "210" can get B1 for 90° and/or B1 for "cyclic quadrilateral"
15	(a) (b) eg $x = 0.3939\dots$ so $100x = 39.3939\dots$ $99x = 39$ so $x = \frac{39}{99} = \frac{13}{33}$	0.2727...	1 3	B1 for 2.27 recurring or 0.2727.... oe or 0.273 M1 for $100x = 39.39\dots$ 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
	(b)	245	1	A1 for $d = 5t^2$ oe (cao) 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)	(0, 9)	3	B1 cao
	(ii)	(8, 25)		B1 for $x = 8$ cao B1 for $y = 25$ cao SC: B1 for (25, 8)
	(b) $\text{LHS} = \left(\frac{100 - (x^2 - 16x + 64)}{4} \right)$ $= \left(\frac{36 + 16x - x^2}{4} \right)$ $\text{RHS} = \left(\frac{36 - 2x + 18x - x^2}{4} \right) = \text{LHS}$		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 $(\frac{2 \times 5 - (x-8)}{2})(\frac{2 \times 5 + (x-8)}{2})$ 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 $(\sqrt{9})^3 : (\sqrt{81})^3$ oe or 9^3 or 2700– A1 cao
19 (a)(i)	$64^{\frac{2}{3}} = \frac{1}{\frac{2}{2}} \text{ or } 64^{\frac{2}{3}} = (4^2)^{-1}$ 64^3	1	1	B1 cao
(ii)		8	1	B1 cao
(iii)		$\frac{1}{16}$	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)	$\sqrt{27} = \sqrt{9 \times 3}$ or $\sqrt{27} = 3\sqrt{3}$ or $\sqrt{27} = 3^{3/2}$	$\frac{5}{2}$ oe	2	M1 for $\sqrt{27} = \sqrt{9 \times 3}$ or $\sqrt{27} = 3^{3/2}$ A1 for $\frac{5}{2}$ oe (cao) Alternative method M1 for $9 \times 27 = 3^{2n}$ 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) $(\overline{OM} =) a + 2b \quad (\overline{ON} =) 3a \text{ or } \frac{6}{2}a$ $(\overline{MN} =) -a - 2b + 3a$ (b) $(\overline{OX} =) 2a + b \quad (\overline{OY} =) b + 4a$ $(\frac{1}{2} \overline{QR} =) 2a - b \text{ or } (\frac{1}{2} \overline{RQ} =) b - 2a$	$2a - 2b$ $\overline{XY} = 2a$ (hence parallel)	2 2	B2 (B1 for either \overline{OM} or \overline{ON} or $-a - 2b + 3a$ SC: B1 for $2b - 2a$ B1 for either \overline{OX} or \overline{OY} or $(\frac{1}{2} \overline{QR})$ B1 for $\overline{XY} = 2a$ or $\overline{YX} = -2a$

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 $0.515 \times “91.5”$ 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) (b) $12^2 + 16^2 = 400$ $\sqrt{400} = 20$ (c) $\pi \times 10^2$	Angle in a semicircle 20 314	1 3 3	B1 oe M1 for $12^2 + 16^2$ M1 for $\sqrt{144 + 256}$ A1 cao 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)	$(1 \times 10) + (3 \times 15) + (5 \times 30) + (7 \times 35) +$ $(9 \times 25) + (11 \times 5) = 730$ $"730" \div 120 = 6.08333$	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 1 st 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

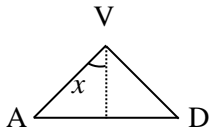
Paper 5525/06				
No	Working	Answer	Mark	Notes
12	(a) $84 = 6.7\pi + 2 \times 6.7 + 2a$ $2a + 13.4 = 62.95\dots$ or $2a + 34.44 = 84$	24.8	3	M1 for substituting correctly, π may be left M1 for correct rearrangement as far as $\pm 2a$ A1 for 24.7 – 24.8
	(b) $P = \pi r + 2r + 2a$ $P - 2a = \pi r + 2r$ $P - 2a = (\pi + 2)r$	$\frac{P - 2a}{\pi + 2}$	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 $56 \times 0.961(26\dots)$ or 107.6... A1 53.8 – 53.9 SC 107.6 is B2
14	(a)	4.5	1	B1 cao
	(b) $500 \times 1.045^{20} = 1205.857\dots\dots$	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	<p>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</p> <p>M1 (indep) for one correct expansion involving x^2 A1 for simplification to final answer</p>

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

Paper 5525/06				
No	Working	Answer	Mark	Notes
16 (a)	$P(\text{win}) = \frac{2}{5} \times \frac{3}{5} + \frac{2}{5} \times \frac{1}{5} (= \frac{8}{25})$	$\frac{8}{25}$	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 $P(\text{win}) = \frac{2}{5} \times \frac{3}{5} + \frac{2}{5} \times \frac{1}{5}$ 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) \div (Upper bound of weight) Where $1150 \leq \text{LB load} < 1200$ and $60 < \text{UB Weight} \leq 65$ 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) \div (lower bound of weight) Where $1200 < \text{UB load} \leq 1250$ and $55 \leq \text{LB weight} < 60$ 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)	$3^4 x^4 y^8$	$81x^4 y^8$	2	B2 for $81x^4 y^8$ (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)	<p>V</p>  <p>V</p> <p>A D</p> <p>$DVA = 2 \times \sin^{-1}\left(\frac{2}{6}\right)$</p> <p>OR</p> $\cos DVA = \frac{6^2 + 6^2 - 16}{2 \times 6 \times 6}$ $= \frac{56}{72}$ $DVA = \cos^{-1}\left(\frac{56}{72}\right) = 38.94$	38.9	3	<p>M1 $\sin x = \frac{2}{6}$ oe</p> <p>M1 for $DVA = 2 \times \sin^{-1}\left(\frac{2}{6}\right)$ A1 38.9 – 38.95</p> <p>OR</p> <p>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</p>

Paper 5525/06				
No	Working	Answer	Mark	Notes
19 (c)	$AC^2 = 2^2 + 2^2 - 2 \times 2 \times 2 \times \cos 120^\circ$ $AC = \sqrt{12}$ 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 $AVC = 2 \times \sin^{-1} \frac{\sqrt{3}}{6}, \text{ using } AN$ OR $AVC = 2 \times \cos^{-1} \frac{\sqrt{33}}{6}, \text{ using } VN$	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 $AC = \sqrt{12}$ ($= 3.46\dots$) or $AN = \sqrt{3}$ ($= 1.73\dots$) or $VN = \sqrt{33}$ ($= 5.74\dots$) 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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