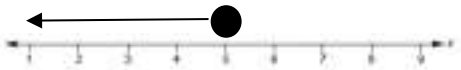
Question			Answer	Marks	Part marks and guidance	
1	(a)		14	1		Accept 14.0
1	(b)		[0].25 or $\frac{1}{4}$	1		
2			Shows 56% or 0.56 and 0.54 or $\frac{56}{100}$ and $\frac{54}{100}$ or equivalent fractions with a common denominator or shows 13.5 [out of 25] and 14	3	**M2** for $\frac{14}{25}$ × 100 oe or 0.56 or for $\frac{54}{100}$ × 25 oe **OR** **M1** for $\frac{14}{25}$ seen or for $\frac{54}{100}$ or 0.54 seen	Allow 3 marks or M2 for correct values/method isw other working For M2 accept $\frac{10+4}{10+15}$×100 instead of $\frac{14}{25}$×100 For $\frac{14}{25}$ × 100 oe e.g. $\frac{14\times4}{25\times4}$ M2 implied by 13.5 Accept 14 out of 25 seen for M1
3			Rotation 90 clockwise oe (5, 2)	3	**B1** for each	More than one transformation scores zero Extra properties treat as choice Do not accept e.g. turn for rotation e.g. 270 [anticlockwise], –90 Condone 5, 2 but not $\binom{5}{2}$
4	(a)		x ≤ 5 final answer	1		
4	(b)			2	Allow correct or **FT** *their* inequality in part (a) **B1FT** *their* inequality in part (a) for an open circle with correct arrow/line or for a solid circle with incorrect arrow/line or for a solid circle with correct line/arrow but one additional circle on the line at the end	Arrow can be short If line rather than arrow, then line will need to reach 1 on number line for 2 marks B0 for solid circle and no line/arrow

Question			Answer	Marks	Part marks and guidance	
5			40	3	**M2** for $\frac{11}{20}$ or $\frac{22}{40}$ or $[1]\frac{15}{20} - [1]\frac{4}{20}$ or $[1]\frac{4}{20} + \frac{22}{d} = [1]\frac{15}{20}$ or $\left[\frac{22}{d} =\right]\frac{35}{20} - \frac{24}{20}$ oe or $\frac{24}{20} + \frac{22}{d} = \frac{35}{20}$ oe	Accept other equivalent fractions with a common denominator for M2 or M1 M2 implied by $\frac{22}{0.55}$ For M2 accept e.g. $\frac{7\times5}{4\times5} - \frac{6\times4}{4\times5}$ Accept e.g. $\left[-\frac{22}{d} =\right]\frac{24}{20} - \frac{35}{20}$ for M2
					or **M1** for $[1]\frac{3}{4} - [1]\frac{1}{5}$ oe or $\frac{35}{20}$ and $\frac{k}{20}$ or $\frac{k}{20}$ and $\frac{24}{20}$ or $[1]\frac{15}{20}$ and $[1]\frac{p}{20}$ or $[1]\frac{p}{20}$ and $[1]\frac{4}{20}$	M1 implied by 0.55 or [1].75 – [1].2 $p < 20$
					OR	
					M2 for $7 \times 5 \times d - 6 \times 4 \times d = 22 \times 5 \times 4$ or better	$35d - 24d = 440$
					or **M1** for $\frac{6\times d+22\times5}{5d} = \frac{7}{4}$ oe	$\frac{6d+110}{5d} = \frac{7}{4}$, accept e.g. $\frac{6d}{5d} + \frac{110}{5d} = \frac{7}{4}$
					or $\frac{4\times6\times d+22\times5\times4}{20d} = \frac{7\times5\times d}{20d}$ oe	$\frac{24d+440}{20d} = \frac{35d}{20d}$

6	**(a)**		8 with correct working	**4**	**B3** for answer 7 with correct working OR Listing: **M3** for [10], 80, 150, 220, 290, 360, 430, 500 or for 70, 140, 210, 280, 350, 420, 490 or **M2** for two correct lists up to at least the first common term 80 or 70 Or **M1** for a list with at least [10,] 24, 38, 52, 66, 80 **or** [10,] 45, 80 or a list with at least 14, 28, 42, 56, 70 **or** 35, 70 OR Calculation: **M3** for (500 – 10) ÷ 70 [+ 1] oe or **M2** for 2 × 5 × 7 implied by LCM = 70 or **M1** for showing prime factors of 14 and 35 [14 =] 2, 7 and [35 =] 5, 7 If **0** or **1** scored, instead award **SC2** for answer 8 with no or insufficient working If **0** scored, instead award **SC1** for answer 7 with no or insufficient working	Correct working requires evidence of at least **M2** If answer 8 and M2 earned award 4 marks If answer 7 and M2 earned award B3 If candidate uses both listing and calculation methods, mark the better of these methods e.g. [10,] 24, 38, 52, 66, 80 and [10,] 45, 80 or 14, 28, 42, 56, 70 … and 35, 70. isw errors beyond 80 or 70 for M2 but not M3 isw any errors beyond these values For M3 accept e.g. 10 + 70(*n* [–1]) = 500 Condone e.g. HCF = 70 but 70 must come from use of prime factors Allow e.g. 2, 7 and 5, 7 on factor trees or in Venn diagram Do not award SC2 if clearly from wrong working Do not award SC1 if clearly from wrong working

Question			Answer	Marks	Part marks and guidance	
6	(b)		$14n - 4$ oe final answer	2	**B1** for answer $14n + k$ oe or $-4 + pn$ oe ($p \neq 0$) or for correct answer seen then spoilt	Accept unsimplified for 2 marks or B1 Condone $n = 14n - 4$ Condone use of other variable e.g. $14x - 4$ for 2 marks or B1
7	(a)		Draws ruled line $y = 2x - 3$ **AND** $x = 2$ and $y = 1$	4	**M2** for drawing ruled line $y = 2x - 3$ or **M1** for correct line but freehand or for ruled line with gradient 2 or for ruled line with positive gradient passing through (0, –3) **B2FT** for $x = 2$ and $y = 1$ or **B1FT** for one correct value	Accuracy - use overlay as a guide and line must touch circles For M2 must reach at least (0, –3) and intersection with $x + y = 3$ **FT** *their* intersection of *their* ruled or freehand line with given line Allow correct or FT for B2 and B1 If intersection is not on integer values allow reasonable estimated readings
7	(b)		Showing $2y - 4x = 7$ can be written as $y = 2x + 3.5$ oe Or Rearranges equations to the same form for comparison e.g. $2y = 4x + 6$ and $2y = 4x + 7$, or $2y - 4x = 6$ and $2y - 4x = 7$ or states that both have gradient of 2 with no error in rearrangement seen correct oe and the lines are parallel/have same gradient/ have no solutions oe	1 **1dep**	Accept other working that supports a conclusion of parallel or no solutions Dep on first mark and with no errors seen	eg $2(2x + 3) - 4x = 7$ and $4x + 6 - 4x = 7$ or better $2y = 4x + 6$ and $2y - 4x = 7$ then eliminates x or y leading e.g. $6 - 7$ oe or 'no solutions'

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Part marks and guidance</th><th></th></tr>
<tr><td>8</td><td></td><td></td><td>incorrect oe
and
shows
[30 ÷ (7 – 2) × 14 =] 84 oe</td><td>5</td><td>M4 for 30 ÷ (7 – 2) × 14 oe
or total 84
or
M3 for 30 ÷ (7 – 2) × k oe where k = 1, 2, 5, 7
or
B3 for [totals] 140 and 210
or
B2 for [total] 140 or 210
or
M1 for 30 ÷ (5 – 2) × k oe where k = 1, 2, 5, 7
or 14
or for 30 ÷ (7 – 5) × k oe where k = 1, 2, 5, 7
or 14</td><td>Accept for M4 e.g. 12 + 30 + 42
For all marks isw other totals/working, could use trials to reach acceptable totals
M3 may be implied by 12 , 30 and 42 seen

If method not shown
M1 may be implied by 20, 50 and 70 seen
If method not shown
M1 may be implied by 30, 75 and 105 seen</td></tr>
<tr><td>9</td><td></td><td></td><td>Correct two-way table constructed and completed
<table><tr><td></td><td>Autumn</td><td>Spring</td><td>Summer</td></tr><tr><td>Class A</td><td>90</td><td>120</td><td>40</td></tr><tr><td>Class B</td><td>63</td><td>126</td><td>47</td></tr></table></td><td>6</td><td>B3 for 63 and 126
or B2 for 63 or 126
or M1 for 120 × 1.05 oe or for [5% =] 6
or for $\frac{7}{10}$ × 90 oe or for $\left[\frac{3}{10}=\right]$ 27

M2 for correctly designed table with headings

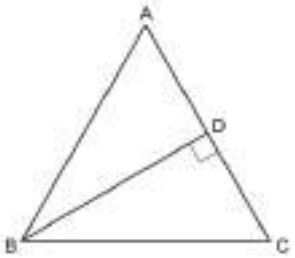
or M1 for 3 by 2 or 2 by 3 table with no headings or error[s] in headings

A1 (dep on M2 or M1 for table) for six correct or FT entries placed consistently in table</td><td>For all marks ignore additional columns or rows on table for attempts to find totals.
Ignore extra rows if not used
For M and A marks ignore calculations in cells alongside values in 3 by 2 table

Accept e.g. 3 by 2 table
Condone internal/external lines omitted in table
Accept abbreviated heading e.g. A S S
Allow table headings in any order

FT their 63 and their 126</td></tr>
</table>

Question			Answer	Marks	Part marks and guidance	
10			$6x - 25$ final answer	4	**B1** for $x - 5$ **B2FT** for $4x - 20$ or 4(*their* $(x - 5)$) correctly expanded or **B1FT** for $4(x - 5)$ or 4(*their* $(x - 5)$)	accept e.g. $1x - 5$ *Their* $x - 5$ must be two term expression with one algebraic term e.g. $5 - x$
11			Mass = 1050 or 1000	B1		For B1 accept 1050 or 1000 seen
			Volume = *their* mass ÷ 8 oe	M2	**M1** for *their* mass ÷ 7.9 oe	For M2 or M1 allow use of 1050 or 1000 or *their* mass ÷ 8, *their* mass could be in kg
			Length = $\sqrt[3]{their\ \text{volume}}$	M1	or [Volume =]10 × 10 × 10 = 1000	If cube root not shown allow implied by 5 nfww after 125 shown
			Unreasonable oe and length = 5 [cm]	A1	Dep on B1M2M1 or incorrect and shows [Volume =]1000 and 125	For A1 If 5 [cm] is shown in working it does not need to be stated in conclusion
			OR	OR		
			[Volume =] 10 × 10 × 10 or 10^3	M1		Accept Volume = 1000
			Mass = (10 × 10 × 10) × 8 oe	M2	**M1** for (10 × 10 × 10) × 7.9 oe	
			Their mass converted to kg or 1050 [g] or 1000 [g]	B1		
			Unreasonable oe and either 8 kg with 1 kg or [1.05 kg] or 8000 g with 1050 g or 1000 g	A1	Dep on M1M2B1	For A1 values could be shown in working and do not need to be stated in conclusion See Appendix 1 for alternate method

Question			Answer	Marks	Part marks and guidance	
12						For the M marks, must be clear distinct statements involving equalities of pairs of named sides or pairs of named angles with the reason (if given) alongside the statement Throughout accept A for angle BAD and C for angle BCD.
			Proof of congruency e.g. [Angle] ADB = [Angle] CDB = 90° BD is common oe AB = BC equilateral [triangle] or given oe **OR** [Angle] ABD = [Angle] CBD = 30° BD is common **oe** AB = BC equilateral [triangle] or given	**M3**	**M2** for 2 correct statements with reason[s] or 3 correct statements but incorrect/no reason[s] or **M1** for 1 correct statement with reason or 2 correct but incorrect/no reasons	Do not accept ADB = 90 alone without = angle CDB, accept right angle for 90 Accept e.g. BD = BD, BD is shared, BD is in both If more than 3 statements given, mark to candidates advantage and isw incorrect/incomplete statements alongside correct work for method marks Accept equivalent proofs for AAS involving any two of the three angles and either BD is common or AB = BC (given) Accept [Angle] BAD= [Angle] BCD = 60 or equilateral [triangle] Do **not** accept AD = DC
			[Triangle BDC is congruent to triangle BAD] (RHS) or (SAS)	**A1**	Dep on M3 and no incorrect work seen and condition must fit statements given	See Appendix 2

Question			Answer	Marks	Part marks and guidance	
13			27	3	**B2** for [p =] $3\sqrt{m}$ oe or [p =] $3\sqrt{81}$ oe or **M2** for $15 \times \sqrt{\frac{81}{25}}$ oe or **M1** for $p = k\sqrt{m}$ oe or better **M1** for p = *their* $k\sqrt{81}$ oe	oe e.g. $p = 3m^{\frac{1}{2}}$, $\frac{p}{\sqrt{m}} = 3$, $\frac{p}{3} = \sqrt{81}$ oe e.g. $p = km^{\frac{1}{2}}$, $\frac{p}{\sqrt{m}} = k$, $pk = \sqrt{m}$ *their k* must be numeric
14	(a)		32	2	**B1** for 2^5 oe or for $1024^{\left[\frac{1}{2}\right]}$ or **M1** for $\sqrt[2]{4}^5$ or better	M1 accept e.g. 4 × 4 × 2 $\left(4^{\frac{1}{2}}\right)^5$ alone is not enough for M1
	(b)		$\frac{1}{3}x^2$ or $\frac{x^2}{3}$ final answer	4	**B3** for answer $\frac{1}{3}x^k$ ($k \neq 0$) or $\frac{9}{27}x^2$ or **B2** for answer kx^2 ($k \neq 0$) or $\frac{9}{27}x^k$ or **B1** for $\frac{1}{27}$ seen or $\frac{9}{27}$ seen or x^{-6} oe seen	B1 oe e.g. x^6 seen in the denominator of a fraction
15	(a)		$(x – 3)^2 – 4$ final answer	3	**B1** for $(x – 3)^2$ **B2FT** for [+] 5 – (*their* (a))^2 correctly evaluated after $(x – \textit{their } a)^2$ shown or **M1** for [+] 5 – (*their* (a))^2 shown If 0 scored, **SC2** for final answer $(x – 3) – 4$	FT can be implied eg answer $(x – 6)^2 – 31$ gets B2FT
15	(b)		(3, –4)	2	correct or **FT** *their* part **(a)** **B1FT** for one correct coordinate	Dep on *their* part (a) in form $(x – a)^2 – b$

Question			Answer	Marks	Part marks and guidance	
16			$a = \frac{3p-2b}{1+p}$ final answer	4	**M1** for $p(3 - a) = a + 2b$ or better **M1** for expanding bracket **M1** for isolating terms in a **M1** for removing a as a factor and dividing by bracket to the answer	For 4 marks accept $a = \frac{2b-3p}{-p-1}$ as final answer If answer $a = 3p - 2b/1 + p$ check working and if seen written correctly allow 4 marks Each method step FT previous step $3p - pa = a + 2b$ if correct, implies M1M1 $3p - 2b = a + pa$ if correct Dep on at least two terms in a when fraction removed If answer incorrect then max 3 marks
17	(a)		Completes table with $0 < m \leq 2 = 5$ and $10 < t \leq 20 = 3$ **and** Draws correct bars on histogram $2 < m \leq 5$ to 4 $5 < m \leq 10$ to 3.6	4	**B2** for both frequencies correct in table or **B1** for one frequency correct in table **B2** for both bars correct or **B1** for one bar correct or **M1** for [FD's =] $12 \div 3$ oe and $18 \div 5$ oe soi	 Bar must touch correct horizontal line for the majority of the interval For B2 no gaps between bars Do not accept omission of horizontal line at 4 on first bar
17	(b)		17.5 ≤ R < 19.5	2	**B1** for each value	

Question			Answer	Marks	Part marks and guidance	
18			$6\frac{2}{5}$ final answer with correct working	5	**B4** for $\frac{64}{10}$ oe with correct working isw cancelling **OR** **B1** for [$0.\dot{2}$ =] $\frac{2}{9}$ oe fraction **B2** for $\frac{128}{90}$ oe fraction or **M1** for [*n* =1.422….] and [100*n* =] 142.2… oe or better or [*n* =] 1.422…. and [10*n* =] 14.22… or better or shows e.g. [*n* = 0.422….] and [100*n* =] 42.2… oe or better If 0, 1 or 2 scored, instead award **SC3** for $6\frac{2}{5}$ with no or insufficient working If 0 or 1 scored, instead award **SC2** for answer $\frac{64}{10}$ oe with no or insufficient working	Correct working requires $\frac{2}{9}$ oe fraction seen and $\frac{128}{90}$ oe fraction seen or alternate convincing approach e.g. B4 for $6\frac{4}{10}$, $\frac{32}{5}$, $\frac{576}{90}$, $\frac{1152}{180}$ with correct working For B2 condone e.g. $\frac{12.8}{9}$ oe any correct approach that allows elimination of the recurring decimal Implied by e.g. 90*n* = 128 , 9*n* = 12.8 implied by [1] $\frac{38}{90}$ oe seen

Question			Answer	Marks	Part marks and guidance	
19			34π final answer with correct working	5	**M2** for $\mathrm{AB}^2 = \frac{16\times360}{40}$ or better or **M1** for $\frac{40}{360}[\pi]\mathrm{AB}^2[= 16[\pi]]$ oe or area of full circle = $\frac{360}{40}$ ×16 $[\pi]$ or $144[\pi]$ **A1** for AB = 12 or better e.g. $\frac{\mathrm{AB}}{2}$= 6 **M1** for $\pi\left(\frac{their\ \mathrm{AB}}{2}\right)^2 \div 2$ [+ 16π] oe If 0 or 1 scored instead award **SC2** for answer 34π with no or insufficient working If 0 scored, award **SC1** for AB = 12 with no or insufficient working	Correct working requires at least M2A1 For M2 accept AB^2 = 144 Accept other variable for AB e.g. *r* , *d* After M1, A1 implies M2 *their* AB must be clearly indicated in working or on diagram . Allow AB as the answer to *their* work with the sector BAC Do not award SC2 if clearly from wrong working Do not award SC1 if clearly from wrong working
20			$\frac{x-6}{x-7}$ final answer	4	**B1** for (x – 6)(x + 6) isw **AND** **B2** for (x + 6) (x – 7) isw or **M1** for x(x + 6) – 7(x + 6) seen or x(x – 7) + 6(x – 7) seen or for (x + a) (x + b) where a + b = –1 or ab = – 42 isw	If answer x – 6/x – 7 check working and if seen written correctly allow 4 marks
21	(a)		The two events are independent or probability of yellow stays the same or there are 10 sweets in the bag for the 2nd pick OR Puts the first sweet back oe e.g. the sweets are replaced	1		Do not accept incorrect statements e.g. You do not pick a yellow sweet first and if you do you put it back in the bag

Question			Answer	Marks	Part marks and guidance	
21	(b)		$\frac{28}{90}$ oe with correct working	5		Correct working requires evidence of at least M4 isw cancelling/conversion to dec/% after $\frac{28}{90}$ leading to answer For method marks throughout e.g. RY = $\frac{4}{10} \times \frac{2}{9}$ ignore label RY
					M4 for $\frac{4}{10} \times \frac{2}{9} + \frac{2}{10} \times \frac{4}{9} + \frac{4}{10} \times \frac{3}{9}$ oe	M4 accept $\frac{8}{90} + \frac{8}{90} + \frac{12}{90}$ or $\frac{4}{45} + \frac{4}{45} + \frac{6}{45}$ oe
					or **M3** for the addition of two of the above products oe (no extras) or all three products oe shown with no more than one extra product oe	M3 accept e.g. $\frac{8}{90} + \frac{12}{90}$ or $\frac{4}{45} + \frac{6}{45}$ oe
					or **M2** for one or more of the above products (standalone or added to extras)	M2 accept e.g. $\frac{8}{90}$ or $\frac{4}{45}$ or $\frac{12}{90}$ or $\frac{6}{45}$ oe nfww M3 and M2 spoiled if part of a larger product with other probabilities
					or **M1** for only GY, YG and GG identified	M1 may be seen in a list or indicated on a tree
					or for $\frac{4}{10}$ and $\frac{n}{9}$ seen or for $\frac{2}{10}$ and $\frac{n}{9}$ seen	Where $0 < n < 9$
					or for $\frac{k}{10} \times \frac{p}{9}$ oe seen	Where $0 < k < 10$ and $0 < p < 9$ M1 implied by $\frac{m}{90}$ seen , $1 < m < 90$
					If **0** or 1 scored, instead award **SC2** for answer $\frac{28}{90}$ oe with no or insufficient working	

Question			Answer	Marks	Part marks and guidance	
22			21 with correct working	6		Correct working requires evidence of at least M2A1B1
					M2 for $\sqrt{7^2 + 5^2 - 2 \times 7 \times 5 \times 0.8}$ oe	Allow M2 for square root soi later after correct substitution seen For M2, accept e.g. $\sqrt{49 + 25 - 70 \times 0.8}$
					or **M1** for $7^2 + 5^2 - 2 \times 7 \times 5 \times 0.8$ oe	For M1 accept 49 + 25 – 70 × 0.8
					A1 for $\sqrt{18}$ or $3\sqrt{2}$	After M1 and $\sqrt{18}$ allow M2A1
					AND	
					B1 for sin 45 = $\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$	For **B1** sin 45 must be used within the method e.g. not just seen as sin 45 = $\frac{\sqrt{2}}{2}$
					M1 for $\frac{1}{2} \times 14 \times their\text{BD} \times \sin 45$ oe	*Their* BD must be clearly indicated in working or on diagram . Allow BD as the answer to *their* work with triangle ABD
					If 0 or 1 scored instead award **SC2** for answer 21 with no or insufficient working If 0 scored instead award **SC1** for BD =$\sqrt{18}$ oe	See Appendix 3

Appendix 1 Question 11

A further possibility is to show that the density of the 10 cm cube is different to 7.9 g/cm^3

11			Mass = 1050 or 1000 or 0.0079 or 0.008	**B1**		For B1 accept 1050 or 1000 or 0.0079 or 0.008 seen
			[Volume =]10 × 10 × 10 or 10^3	**M1**		Accept Volume = 1000
			1000 ÷ (10 × 10 × 10) oe or 1[kg] ÷ (10 × 10 × 10) oe	**M2**	**M1** for 1050 ÷ (10 × 10 × 10) oe or 1.05[kg] ÷ (10 × 10 × 10) oe	
			Unreasonable oe and [density =] 1 oe or [density =]0.001 and 0.0079 or 0.008	**A1**	Dep on M1M2B1	For A1 , [density =] 1 could be shown in working and does not need to be stated in conclusion