1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
1.	(i)		$30x - 10y$	5	B2 cao (If no marks then B1 $30x$, B1 $10y$)
	(ii)	$6 - 12x - 3x - 3 = 0$ $3 - 15x = 0$ $15x = 3$	$\frac{1}{5}$		M1 for correct multiplication of brackets to get $6 - 12x - 3x - 3$ A1 $3 - 15x = 0$ B1 ft for "$\frac{1}{5}$"
					Total for Question: 5 marks
2. **QWC iii FE**		See table at end	Best month and supporting explanation	4	M1 Converts for at least 2 months to a common format (fractions, decimals or %age) A1 all correct C1 for Council target: No (yes) dep on M1 and consistent with the candidates calculations **QWC: Decisions should be stated, following through from working out** C1 March with all calculations correct for the 3 months **QWC: Decisions should be stated, following through from working out**
					Total for Question: 4 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
3. **FE**		No of tiles around room = 2 × lengths of room = 8, 16, 16, 12 Total number of tiles = 8 × 16 + 8 × 12 = 224 Cost = 4 × 224 **OR** Area of the room =4 × 8 + 4 × 6 = 56 Area of a tile = 0.5 × 0.5 = 0.25 Number of tiles = 56 ÷ 0.25 = 224 Cost = 4 × 224	£ 896	6	M1 for doubling each length to show number of tiles for each side B1 for 8, 16, 16 and 12 M1 for a full method of finding the number of tiles (12 × 16 + 8 × 4) A1 for at least one 'section' correct M1 for 4 × '224' A1 cao **OR** M1 for full method for finding the area of the room A1 at least one area correct B1 for area of tile = 0.25m^2 or 2500 cm^2 or 4 tiles = 1 m^2 M1 for area of room ÷ area of a tile M1 for 4 × number of tiles A1 cao
					Total for Question: 6 marks
4.	(a)	$5p = 20$	$p = 4$	2	M1 add 16 to both sides A1 cao
	(b)	$-9 = 3q$	$q = -3$	2	M1 correct method to isolate $\pm 3q$ A1 cao
	(c)	$6x - 3 - 10 - 6x =$	-13	2	M1 at least one expansion correct A1 -13 or a statement that the answer is indep of x depending on correct working
					Total for Question: 6 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
5.	(i)		32	1	B1 cao
	(ii)	$2n^2 = 400$, $n^2 = 200$, n not a whole number	No + explanation	2	M1 sets $2n^2 = 400$ C1 and concludes correctly **OR** M1 14th term is (392), 15th term is (450) C1 and concludes correctly
					Total for Question: 3 marks
6. **FE**		15400 ÷ 70 × 100 = 22000 22000 × 2÷ 100	440	4	M1 15400 ÷ 70 × 100 oe A1 22000 M1 '22000' × 2 ÷ 100 oe A1 cao
					Total for Question: 4 marks
7.	(a)	66 = 2 ×33 = 2 × 3 × 11	2 × 3 × 11	2	M1 Successive division by 2 and 3 either by a factor tree or by repeated division A1 cao
	(b)	$132^2 = 4 \times 66^2$ $= 2^2 \times (2 \times 3 \times 11)^2$ **OR** $132^2 = 17424 = 2 \times 8712$ $= 2 \times 2 \times 4356 =$ $2^3 \times 2178 = 2^4 \times 1089$ $=2^4 \times 3 \times 363 =...$	$2^4 \times 3^2 \times 11^2$	2	M1 $(2 \times 3 \times 11)^2$ A1 $2^2 \times 3^2 \times 11^2$ oe **OR** M1 $132^2 = 17424$ and at least 3 correct steps in for example the factor tree
					Total for Question: 4 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
8.		$x + 4x + \frac{1}{2} = 1$ $5x = \frac{1}{2}$, $x = \frac{1}{10}$ **OR** Chooses a suitable number of balls (say 10) 5 will be red The other 5 need to be shared out in the ratio 1:4, Hence 1 yellow and 4 blue	$\frac{4}{10}$	3	M1 $x + 4x + \frac{1}{2} = 1$ A1 $x = \frac{1}{10}$ A1 $\frac{4}{10}$ oe
					Total for Question: 3 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
9.	(a) (i)		a^2	3	B1 cao
	(ii)		$6x^4y^3$		B2 $6x^4y^3$ (B1 for 2 out of 3 terms correct in a product)
	(b)	$x^2 + 3x + 7x + 21$	$x^2 + 10x + 21$	2	M1 3 or 4 terms out of 4 correct in a 4 term expansion A1 cao
	(c)		$3p(q - 4p)$	2	B2 cao (B1 $p(3q - 12p)$, $12p(\frac{1}{4}q - p)$, $p(aq + bp)$ where a and b are numbers)
	(d)(i)	$(3(x+2)-1)(x+2-3)$	$(3y-1)(y-3)$	4	B2 cao (B1 $(3y - m)(y - n)$ where $mn = \pm 3$ or $m + n = \pm 10$
	(ii)	**OR** $3x^2 + 12x + 12 - 10x - 20 + 3$ $= 3x^2 + 2x - 5$	$(3x+5)(x-1)$		M1 use of the factorised form with y replaced twice by $3x + 2$ A1 cao **OR** B1 $3x^2 + 2x - 5$ B1 cao
					Total for Question: 11 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
10.		Reds 6, 12, 18, 24, 30… Greens 9, 18, 27…	$\frac{1}{20}$	3	B1 list of red and green multiples (both to at least 18) or explicitly states 'LCM' B1 works out highest number (90 seen) B1 $\frac{1}{20}$ (accept $\frac{5}{100}$)
					Total for Question: 3 marks
11.		$\frac{x}{5} = \frac{2}{4}$ $\frac{y}{x+5} = \frac{9}{6}$ or $\frac{y}{9} = \frac{x+5}{6}$	$x = 2.5$ $y = 11.25$	4	M1 a correct expression for x involving ratios of sides, e.g. $\frac{x}{5} = \frac{2}{4}$ oe A1 cao M1 $\frac{y}{x+5} = \frac{9}{6}$ or $\frac{y}{9} = \frac{x+5}{6}$ oe A1 cao **OR** $\frac{y}{5} = \frac{9}{4}$ A1 cao
					Total for Question: 4 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
12.	(a)	4 6 8 10 6 8 10 12 8 10 12 14 10 12 14 16 **OR** $\frac{1}{4}\times\frac{1}{4}$ $\frac{1}{4}\times\frac{1}{4}\times 4$	$\frac{4}{16}$	3	M1 Attempts to list all outcome pairs A1 all 16 found A1 cao **OR** M2 $\frac{1}{4}\times\frac{1}{4}\times 4$ (M1 $\frac{1}{4}\times\frac{1}{4}\times 1,\ 2$ or 3) A1 $\frac{4}{16}$ oe
	(b)	Prob Ali wins = $\frac{6}{16}$ Number of wins = $\frac{6}{16}\times 80$	30	3	B1 Prob Ali wins = $\frac{6}{16}$ oe M1 $'\frac{6}{16}'\times 80$ A1 ft
					Total for Question: 6 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
13.	(a)		3.4×10^{7}	1	B1 cao
	(b)	$2.4\times10^{12}\times\frac{5}{100}(\div10^{6})$	1.2×10^{5}	2	M1 $2.4\times10^{12}\times\frac{5}{100}$ oe $(\div10^{6})$ A1 cao
					Total for Question: 3 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
14.		Let $AB = x$, $AD = y$ Area of rectangle $= xy$ Area AXD = $\frac{xy}{4}$ Area CYZ = $\frac{xy}{8}$ Shaded area = $\frac{5xy}{8}$	$\frac{5}{8}$	4	M1 a full method to find the unshaded area and subtracting from 1 B1 area of AXD = area of $ABCD \div 4$ B1 area of CYZ = area of $ABCD \div 8$ A1 cao **OR** **Diagram** M1 for dividing left into 2 congruent triangles for dividing right into 4 congruent triangles B1 left = 2A and 2A or shaded = $\frac{1}{2}$ of $\frac{1}{2} = \frac{1}{4} = \frac{2}{8}$ B1 right = 2A and A and A or shaded = $\frac{3}{4}$ of $\frac{1}{2} = \frac{3}{8}$ A1 cao **Substitution** M1 for deciding upon suitable side lengths for AD and AB and calculating dimensions of internal shapes B1 for area of DZX B1 for area of $ZXBY$ A1 cao **OR** M1 for deciding upon suitable side lengths for AD and AB and calculating dimensions of internal shapes B1 for area ADX B1 for area ZCY A1 cao
					Total for Question: 4 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
15.	(a) (i)	$\vec{BC} = \vec{CO} + \vec{OB}$	12**a** – 4**b**	4	M1 $\vec{BC} = \vec{CO} + \vec{OB}$ A1 cao
	(ii)	$\vec{AQ} = \vec{AO} + \vec{OB} + \vec{BQ}$ $= -4\mathbf{a} + 4\mathbf{b} + \frac{1}{4}(12\mathbf{a} - 4\mathbf{b})$	3**b** – **a**		M1 –4**a** + 4**b** + $\frac{1}{4}$ '(12**a** – 4**b**)' A1 cao
	(b)	$\vec{OX} = 12\mathbf{b}$, $\vec{AX} = -4\mathbf{a} + 12\mathbf{b}$ $= 4(-\mathbf{a} + 3\mathbf{b})$	Correct reason, with correct working	3	B1 $\vec{OX} = 12\mathbf{b}$ B1 $\vec{AX} = -4\mathbf{a} + 12\mathbf{b}$ C1 convincing explanation
					Total for Question: 7 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
16.		$\frac{4}{10}\times\frac{6}{9}\times\frac{5}{8} = \frac{120}{720}$ $\frac{120}{720} + \frac{6}{10}\times\frac{5}{9}\times\frac{4}{8} + \frac{6}{10}\times\frac{4}{9}\times\frac{5}{8}$	$\frac{360}{720}$	4	M1 for $\frac{4}{10}\times\frac{6}{9}\times\frac{5}{8}$ A1 for $\frac{120}{720}$ oe M1 $\frac{'120'}{720}$ + 2 correct cases (M1 any 2 correct cases) **or** $\frac{'120'}{720}$ X 3 A1 cao SC with replacement M1 $\frac{4}{10}\times\frac{6}{10}\times\frac{6}{10}$ M1 $\frac{4}{10}\times\frac{6}{10}\times\frac{6}{10}\times3$
					Total for Question: 4 marks
17.		$\frac{(3x+5)(x-7)}{(3x-5)(3x+5)}$	$\frac{x-7}{3x-5}$	3	B1 $(3x+5)(x-7)$ B1 $(3x-5)(3x+5)$ B1 $\frac{x-7}{3x-5}$
					Total for Question: 3 marks

1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
18.	(a)		$\frac{1}{2}$	1	B1
	(b)	$(2+\sqrt{3})\times(1+\sqrt{3})$ $= 2+2\sqrt{3}+\sqrt{3}+\sqrt{9}$	$5+3\sqrt{3}$	2	M1 4 term expansion with 3, 4 terms correct and sight of 3 or $\sqrt{9}$ A1 cao
					Total for Question: 3 marks
19.	(a)		Smooth curve	2	B1 correct plot of their values B1 smooth curve through their points
	(b)		$x=3$ $y=0$	3	M1 attempts to draw circle at origin M1 uses radius 3 cm (using graph scale correctly) A1 cao **OR** B1 for substituting a value of x into $y=x(x-3)$ and $x^2+y=r^2$ B1 for substituting y into $x=3$ into $x(x-3)$ and $x^2+y=r^2$ B1 cao
					Total for Question: 5 marks

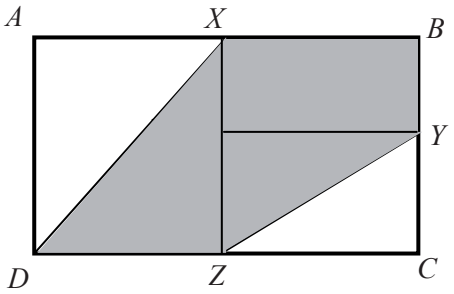
1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
20. **QWC ii, iii**		$(2n+1)^2-(2n-1)^2$ = $4n^2+4n+1-(4n^2-4n+1)$ = $8n$ **OR** $(2n+1)^2-(2n-1)^2$ = $((2n+1)-(2n-1))(2n+1+2n-1))$ = $2 \times 4n = 8n$	Fully algebraic argument, set out in a logical and coherent manner	6	B2 the nth term for consecutive odd numbers is $2n-1$ oe (B1 $2n+k,\ k \neq -1$ or $n = 2n-1$ or $2x-1$ B1 use of $2n+1$ and $2n-1$ oe M1 $(2n+1)^2-(2n-1)^2$ M1 $4n^2+4n+1-(4n^2-4n+1)$ C1 conclusion based on correct algebra **QWC: Conclusion should be stated, with correct supporting algebra.** **OR** B1 use of $2n+1$ and $2n-1$ oe M1 $(2n+1)^2-(2n-1)^2$ M1 $((2n+1)-(2n-1))(2n+1+2n-1))$ C1 conclusion based on correct algebra **QWC: Conclusion should be stated, with correct supporting algebra.**
					Total for Question: 6 marks

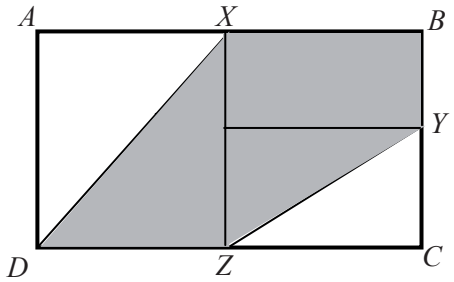
1MA0/1H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
21.		<table><tr><th>L</th><th>F</th><th>FD</th><th>CF</th></tr><tr><td>0–10</td><td>40</td><td>4</td><td>40</td></tr><tr><td>10–20</td><td>60</td><td>6</td><td>100</td></tr><tr><td>20–40</td><td>90</td><td>4.5</td><td>190</td></tr><tr><td>40–80</td><td>60</td><td>1.5</td><td>250</td></tr><tr><td>>80</td><td>0</td><td>0</td><td>250</td></tr></table>	Histogram **OR** Cumulative Frequency polygon 82%	6	B1 Scales labelled and also marked on the vertical axis with frequency density or with cumulative frequency M1 frequency densities calculated, at least one non-trivial one correct. A1 all correctly plotted (M1 cumulative frequencies correct) M1 Use 50 on the horizontal scale of CF diagram read off vertical axis (200-210) **or** Use 50 on the horizontal scale of a histogram and covert area to the left to a frequency M1 convert to a percentage A1 80 – 85
					Total for Question: 6 marks

2.

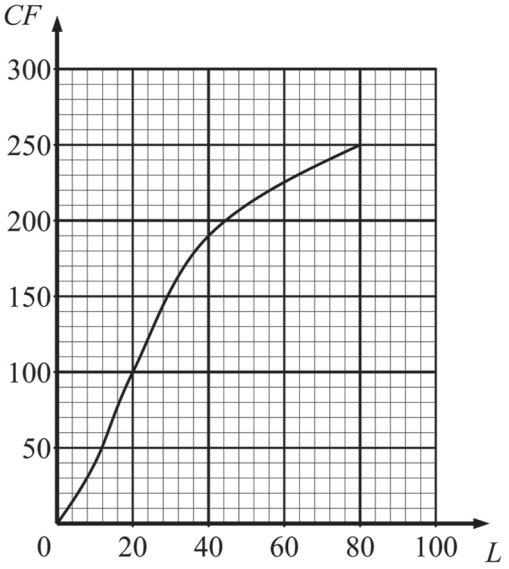
	Fraction	Decimal	%	kg
Jan	$\frac{1}{10}$	0.1	10%	Not known
Feb	$\frac{1}{8}$	0.125	12.5%	15 kg
Mar	$\frac{13}{100}$	0.13	13%	14.56 kg

14.





21.



OR