

Specification A: Paper 1 Higher Tier

1MA0/1H				
Question	Working	Answer	Mark	Additional Guidance
1.			5	
(i)		$30x - 10y$		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.			4	
QWC		Best month and supporting explanation		M1 Converts for at least 2 months to a common format (fractions, decimals or %age) A1 all correct
iii	See table at end			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
FE				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				

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Question	Working	Answer	Mark
3. FE	No of tiles around room = $2 \times$ lengths of room = 8, 16, 16, 12 Total number of tiles = $8 \times 16 + 8 \times 12 = 224$ Cost = 4×224 OR Area of the room = $4 \times 8 + 4 \times 6 = 56$ Area of a tile = $0.5 \times 0.5 = 0.25$ Number of tiles = $56 \div 0.25$ = 224 Cost = 4×224	£ 896	6
Additional Guidance			
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 ($12 \times 16 + 8 \times 4$) A1 for at least one 'section' correct M1 for $4 \times '224'$ 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 \div area of a tile M1 for $4 \times$ number of tiles A1 cao			
Total for Question: 6 marks			
4.			
(a)	$5p = 20$	$p = 4$	2
(b)	$-9 = 3q$	$q = -3$	2
(c)	$6x - 3 - 10 - 6x =$	-13	2
Additional Guidance			
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			

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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	$15400 \div 70 \times 100 = 22000$ $22000 \times 2 \div 100$	440	4	M1 $15400 \div 70 \times 100$ oe A1 22000 M1 '22000' $\times 2 \div 100$ oe A1 cao
Total for Question: 4 marks				
7.				
(a)	$66 = 2 \times 33 = 2 \times 3 \times 11$	$2 \times 3 \times 11$	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 $132^2 = 17424 = 2 \times 8712$ $= 2 \times 2 \times 4356 =$ $2^3 \times 2178 = 2^4 \times 1089$ $= 2^4 \times 3 \times 363 = \dots$	$2^4 \times 3^2 \times 11^2$	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				

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Question	Working	Answer	Mark
8.	$x + 4x + \frac{1}{2} = 1$ $5x = \frac{1}{2}, x = \frac{1}{10}$ <p>OR</p> <p>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</p>	$\frac{4}{10}$	3
M1 $x + 4x + \frac{1}{2} = 1$ A1 $x = \frac{1}{10}$ A1 $\frac{4}{10}$ oe			
Total for Question: 3 marks			

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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				

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Question	Working	Answer	Mark
10.	Reds 6, 12, 18, 24, 30... Greens 9, 18, 27...	$\frac{1}{20}$	3
Additional Guidance			
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. $\frac{x}{5} = \frac{2}{4}$			
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		Working	Answer	Mark	Additional Guidance
12.	(a)	<p>4 6 8 10 6 8 10 12 8 10 12 14 10 12 14 16</p> <p>OR</p> $\frac{1}{4} \times \frac{1}{4}$ $\frac{1}{4} \times \frac{1}{4}$	$\frac{4}{16}$	3	<p>M1 Attempts to list all outcome pairs A1 all 16 found A1 cao</p> <p>OR</p> <p>M2 $\frac{1}{4} \times \frac{1}{4}$ (M1 $\frac{1}{4} \times \frac{1}{4}$ or 3) A1 $\frac{4}{16}$ oe</p>
	(b)	<p>Prob Ali wins = $\frac{6}{16}$</p> <p>Number of wins = $\frac{6}{16} \times 80$</p>	30	3	<p>B1 Prob Ali wins = $\frac{6}{16}$ oe M1 $\frac{6}{16} \times 80$ A1 ft</p>
Total for Question: 6 marks					

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Question	Working	Answer	Mark	Additional Guidance
13. (a)		3.4×10^7	1	B1 cao
(b)	$2.4 \times 10^{12} \times \frac{5}{100} (\div 10^6)$	1.2×10^5	2	M1 $2.4 \times 10^{12} \times \frac{5}{100}$ oe ($\div 10^6$) 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	<p>M1 a full method to find the unshaded area and subtracting from 1 B1 area of $AXD = \text{area of } ABCD \div 4$ B1 area of $CYZ = \text{area of } ABCD \div 8$ A1 cao</p> <p>OR</p> <p>Diagram</p> <p>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</p> <p>Substitution</p> <p>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</p> <p>OR</p> <p>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</p>
Total for Question: 4 marks					

1MA0/1H		Working	Answer	Mark	Additional Guidance
15.	(a)	$\vec{BC} = \vec{CO} + \vec{OB}$	$12\mathbf{a} - 4\mathbf{b}$	4	$\vec{BC} = \vec{CO} + \vec{OB}$ A1 cao
	(i)				
	(ii)	$\vec{AQ} = \vec{AO} + \vec{OB} + \vec{BQ}$ $= -4\mathbf{a} + 4\mathbf{b} + \frac{1}{4}(12\mathbf{a} - 4\mathbf{b})$	$3\mathbf{b} - \mathbf{a}$		M1 $-4\mathbf{a} + 4\mathbf{b} + \frac{1}{4}$ '(12a - 4b)' 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					

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Question	Working	Answer	Mark
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 $\frac{120}{720} \times 3$ A1 cao SC with replacement M1 $\frac{4}{10} \times \frac{6}{10} \times \frac{6}{10}$ M1 $\frac{4}{10} \times \frac{6}{10} \times \frac{6}{10} \times 3$
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			

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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 sign 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				

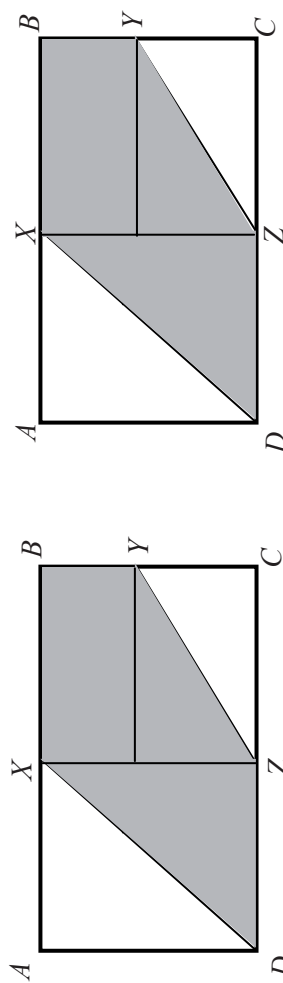
1MA0/1H		Additional Guidance	
Question	Working	Answer	Mark
20. QWC ii, iii	$(2n+1)^2 - (2n-1)^2$ $= 4n^2 + 4n + 1 - (4n^2 - 4n + 1)$ $= 8n$ <p>OR</p> $(2n+1)^2 - (2n-1)^2 = ((2n+1) - (2n-1))(2n+1 + 2n-1)$ $= 2 \times 4n = 8n$	Fully algebraic argument, set out in a logical and coherent manner	6
		B2 the n th 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

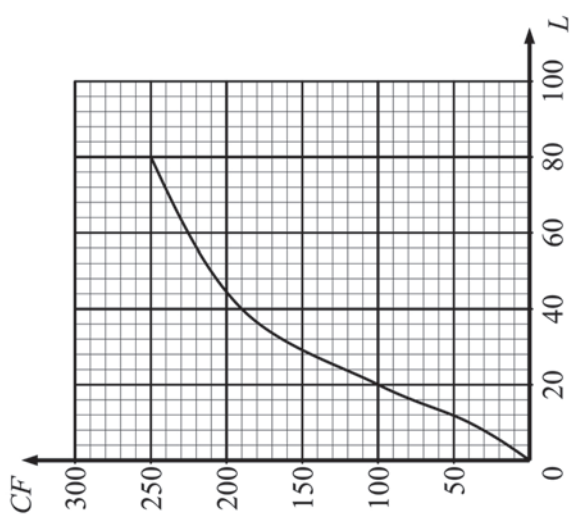
1MA0/1H		Working		Answer	Mark	Additional Guidance																							
21.		<table border="1"> <thead> <tr> <th>L</th> <th>F</th> <th>FD</th> <th>CF</th> </tr> </thead> <tbody> <tr> <td>0-10</td> <td>40</td> <td>4</td> <td>40</td> </tr> <tr> <td>10-20</td> <td>60</td> <td>6</td> <td>100</td> </tr> <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> </tbody> </table>	L	F	FD	CF	0-10	40	4	40	10-20	60	6	100	20-40	90	4.5	190	40-80	60	1.5	250	>80	0	0	250	<p>Histogram OR Cumulative Frequency polygon</p> <p>82%</p>	6	<p>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)</p> <p>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 convert area to the left to a frequency M1 convert to a percentage A1 80 – 85</p>
L	F	FD	CF																										
0-10	40	4	40																										
10-20	60	6	100																										
20-40	90	4.5	190																										
40-80	60	1.5	250																										
>80	0	0	250																										
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

