GCSE

Paper 1H (Edexcel Version)

Set B

CM GCSE Practice Papers / Set B / Paper 1H (V1 FINAL)					
Question		**Working**	**Answer**	**Mark**	**Notes**
1		$F = 32 \times 0.12 = 3.84$	3.84	3	P1 : attempt at a suitable conversion, i.e: 1200 cm^2 = 1200 $\times 10^{-4}$ m^2 OR 32 N/m^2 = (32×10^{-4}) N/cm^2 M1 : uses the formula with consistent units ft their conversion A1 : cao = 3.84
2		$3x + 2y = 7$ $x - 2y = -3$ $\Rightarrow 4x = 4$ $\Rightarrow x = 1$ so $y = \frac{1+3}{2} = 2$	$x = 1$, $y = 2$	3	M1 : method to reduce system to one equation, i.e. elimination or substitution. Use of subtraction instead of addition (oe) is M0 M1 : finds one variable and uses it to find the other variable A1 : $x = 1$, $y = 2$ [NB: 2nd M1 is not dependent on 1st M1]
3	(a)	$\frac{1}{6} - \frac{2}{3} = -\frac{3}{6} = -\frac{1}{2}$	$-\frac{1}{2}$		M1 : correct method to add fractions either in terms of x or with 3 substituted A1 : cao

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3	(b)	$\frac{5}{3}\times\frac{1}{3}=\frac{5}{9}$	$\frac{5}{9}$	2	M1 : correct method to divide fractions either in terms of x or with 3 substituted A1 : cao
4		R, B, Y = 2:1:4 So 40 red, 20 blue, 80 yellow counters $\frac{5}{8}\times 40 = 25$, so 15 red counters left 9 blue counters left 48 yellow counters left Ratio is 15:9:48 = 5:3:16	5:3:16	5	P1 : identifies ratio of R, B, Y as 2 : 1 : 4. Can be implied, e.g. by $2x + x + 4x\{=140\}$ or correct workings A1 : 40 red, 20 blue, 80 yellow counters in the bag initially. Can be implied P1 : attempts to find number of red or yellow counters **left** in the bag (not blue!) A1 : two of 15 red counters left, 9 blue counters left, 48 yellow counters left A1 : correct simplified ratio 5 : 3: 16

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5		$x+40=2x+14 \Rightarrow x=26$ $66+66+y+3(26)+y=360$ $2y=360-210=150$ $\Rightarrow y=75$	75	4	P1 : $x + 40 = 2x + 14$ A1 : $x = 26$ (can be implied) dP1 : sum of all angles = 360 ft their x A1 : correct value of y
6	(a)		1	1	B0 : cao
	(b)	$n^2+12-4n=17$ $n^2-4n-5=0$ $(n-5)(n+1)=0$ $n=-1,\ n=5$	$n = -1$, $n = 5$	4	M1 : expands the brackets correctly A1ft : $n^2-4n-5=0$ (forms 3TQ = 0 ft their expansion) M1 : method to solve the quadratic, i.e. factorising (condone sign errors), quadratic formula (correct substitution but condone sign errors) or completing the square (M1 for e.g. $(n-2)^2-4$) A1 : correct solutions

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7		$10 \times 9 \times 8 \times 7 = 5040$ so probability is $\frac{1}{5040}$	$\frac{1}{5040}$	3	P1 : for $10 \times 9 \times 8 \times 7$
					A1 : 5040
					A1ft : probability is 1/'their total number of combinations'
					Special cases: SC1 : use of $9 \times 8 \times 7 \times 6$ leading to 1/3024 is SCP1 A0 A1ft SC2 : use of $9 \times 9 \times 8 \times 7$ leading to 1/4536 is P0 A0 A1ft
8	(a)		explanation	1	C1 : e.g. change in *y* is not 155 / needs to subtract 20 from 155
	(b)		–3	1	B1 : cao
9	(a)		continuous	1	B1 : 'continuous' circled clearly. B0 if there is any ambiguity in their choice
	(b)	Lowest value = 4.6, LQ = 5.55, median = 7.0, UQ = 8.55, Highest value = 9.4	box-plot	3	B1 : whiskers correctly plotted (ignore size of the whiskers)
					B1 : any two of LQ, median, UQ plotted correctly (ignore size)
					B1 : fully correct box plot

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10	(a)	$2^{32} \times 5^{25} = 2^7 \times (2 \times 5)^{25}$ $= 128 \times 10^{25}$ $= 1.28 \times 10^{27}$	1.28×10^{27}	2	M1 : for grouping the (2 x 5). Can be implied by e.g. 10^{25} A1 : cao
	(b)	$a = \frac{54.6 \times 10^9}{3 \times 10^8} = 182$ s $b = \frac{402 \times 10^9}{3 \times 10^8} = 1340$ s so $b - a = 1158 = 1.158 \times 10^3$ s	1.158×10^3	4	P1 : uses time = distance/speed to find either *a* or *b*. Must see $\times 10^6$ for the 'million' in the distance, but condone if unit consistency not accounted for A1 : correct value of *a* or *b*. A1 : correct values of *a* and *b*. Values must be identified as *a* or *b*. A1ft : correct value in standard form of $b - a$ ft their *a* and *b*. [NB: Values must be identified as *a* or *b* or clearly implied, i.e. through their value of $b - a$]

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11	(a)	$\text{gf}(x) = \text{g}(4 - x^2)$ $= 2(4 - x^2) + 3$ * $= 11 - 2x^2$	$11 - 2x^2$	2	M1 : for sight of * A1 : $11 - 2x^2$
	(b)	gf(2) = 11 – 8 = 3 so $\text{hgf}(2) = \text{h}(3) = \frac{1}{3(3)-1} = \frac{1}{8}$	$\frac{1}{8}$	3	M1 : substitutes 2 into their (a) dM1 : attempts to evaluate h at their 3 A1 : cao **Alternative:** $\text{hgf}(x) = \text{h}(11 - 2x^2)$ $= \frac{1}{3(11-2x^2)-1}$ (M1) so $\text{hgf}(2) = \frac{1}{3(11-2(3)^2)-1} = \frac{1}{8}$ (dM1) (A1) dM1 for substitution

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12		$\sqrt{175}=\sqrt{25\times7}=\sqrt{25}\sqrt{7}=5\sqrt{7}$ $\sqrt{63}=\sqrt{9\times7}=\sqrt{9}\sqrt{7}=3\sqrt{7}$ $\sqrt{175}-\sqrt{63}=5\sqrt{7}-3\sqrt{7}=2\sqrt{7}$	$2\sqrt{7}$	4	M1 : attempts to simplify $\sqrt{175}$ or $\sqrt{63}$
					A1 : for $\sqrt{175}=5\sqrt{7}$
					A1 : for $\sqrt{63}=3\sqrt{7}$
					A1 : cao
13	(a)		answer	1	B1 : answer in the range $-1.825\le c\le-1.75$.
	(b)		answer	1	B1 : answer of (x, y), with $1.20\le x\le1.25$ and $-2.6875\le y\le-2.625$
	(c)		answer	1	B1 : two roots in the ranges $3.25\le x_1\le3.35$ and $-1\le x_2\le-0.825$
	(d)		answer	1	B1 : answer of $(1/3x, y)$ ft their (b). Division only needs to be correct to 1dp

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14		$P(*,R) = P(R,R) + P(B,R)$ $= \left(\frac{7}{11}\times\frac{6}{8}\right)+\left(\frac{4}{11}\times\frac{5}{8}\right)$ $= \frac{42}{88}+\frac{20}{88}$ $= \frac{62}{88}$	$\frac{62}{88}$	4	P1 : for $\frac{7}{11}$, $\frac{6}{8}$, $\frac{4}{11}$ or $\frac{5}{8}$ oe seen on diagram or in a calculation
					P1 : for $\frac{7}{11}\times\frac{6}{8}$ or $\frac{4}{11}\times\frac{5}{8}$ oe
					P1 : for $\left(\frac{7}{11}\times\frac{6}{8}\right)+\left(\frac{4}{11}\times\frac{5}{8}\right)$ or $\frac{42}{88}+\frac{20}{88}$ oe
					A1 : oe
15			$3n^2 + 5n + 2$	3	M1 : correct method to start to find *n*th term, e.g. constant second differences or sight of an^2+bn+c (with attempt to form simultaneous eqs)
					M1 : for a method leading to $3n^2$ and either $5n$ or 2
					A1 : $3n^2+5n+2$

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Question		**Working**	**Answer**	**Mark**	**Notes**
16		$x = (n-1)^2[n-(n-1)]$ $= (n-1)^2(n-n+1)$ $= (n-1)^2$ (since $x = (n-1)^2$ and n is a positive integer), therefore x is a square number	proof	3	M1 : extracts a factor of $(n-1)^2$ OR correct method to expand and simplify all the brackets, resulting in correct number of terms A1 : convincingly shows $x = (n-1)^2$ C1 : conclusion, 'therefore x is a square number' oe

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Question		**Working**	**Answer**	**Mark**	**Notes**
17		$m_{AB} = \frac{10-7}{-3-4} = -\frac{3}{7}$ y-intercept of *AB* is thus $7 = -\frac{3}{7}(4) + c \Rightarrow c = \frac{61}{7}$ line perp to *AB* has gradient $\frac{7}{3}$ so y coordinate of *Q* given by $6 = \frac{7}{3}(2) + c \Rightarrow c = 6 - \frac{14}{3} = \frac{4}{3}$ so $PQ = \frac{61}{7} - \frac{4}{3} = \frac{183}{21} - \frac{28}{21} = \frac{155}{21}$ so $OP : PQ = \frac{61}{7} : \frac{155}{21} = 183 : 155$ *	proof	6	P1 : method to find the gradient of *AB* P1 : attempts to find y intercept of *AB* B1ft : correct perp. gradient to *AB* ft their –3/7 dP1 : attempts to find y coordinate of *Q* A1 : correct y coordinates for *P* and *Q* A1 : complete an convincing proof, showing clearly how *PQ* is obtained and the final **given** result

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18		$\frac{360}{8} = 45°$ area of triangle = $\frac{1}{2} \times r \times r \times \sin 45 = \frac{1}{2} r^2 \times \frac{\sqrt{2}}{2}$ $= \frac{1}{4} r^2 \sqrt{2}$ so area of octagon is $8 \times \frac{1}{4} r^2 \sqrt{2} = 2r^2 \sqrt{2}$	proof	4	B1 : sin45 = $\frac{\sqrt{2}}{2}$ oe (e.g. $\frac{1}{\sqrt{2}}$) P1 : attempts to find area of relevant triangle P1 : area of octagon is 8 * area of relevant triangle A1 : complete and convincing proof [May be alternative methods, which should be sent to review.]

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19	(a)		2	1	B1 : cao
	(b)		sketch	4	B1 : circle centred at (2,0). [Does not need to be labelled, but centre needs to be roughly shown to have (2,0) as the centre]
					B1 : y-axis is a tangent to circle at O
					B1 : intersection points of O and (4,0) clearly shown
					B1 : line $x = 3$ clearly shown inside the circle
	(c)	$\sqrt{2^2 - 1^2} = \sqrt{3}$ so coordinates are $(3, \sqrt{3})$ and $(3, -\sqrt{3})$	$(3, \sqrt{3})$, $(3, -\sqrt{3})$	3	P1 : sight of $\sqrt{2^2 - 1^2} = \sqrt{3}$
					A1 : $(3, \sqrt{3})$
					A1 : $(3, -\sqrt{3})$
					[**Alternative: algebraic solution**: Equation of circle is $(x - 2)^2 + y^2 = 4$. When $x = 3$, $y^2 = 3$ (P1) , so $y = \pm$ sqrt(3) Then correct coordinates for A1 A1.]