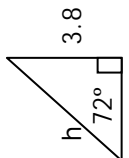


Unit 3 Higher Tier: Number, Algebra, Geometry 2

5MB3H				
Question	Working	Answer	Mark	Additional Guidance
1. FE	$380 \div 200 = 1.9$ $350 \div 175 = 2$	Regular by 0.1p per gram	3	M1 for $380 \div 200 (= 1.9)$ or $200 \div 380 (= 0.526)$ M1 for $350 \div 175 (= 2)$ oe or $175 \div 350 (= 0.5)$ oe C1 for Regular with correct calculations
Total for Question: 3 marks				
2. (a)(i) (ii)		4.08	3	B1 for 5.6644 or 81.8535(2772...) or 76.1(8912772...) or 18.67 B1 for 4.08(0831694) B1 cao
Total for Question: 3 marks				
3.	$2(3x + 2x + 7) = 22$ OR $3x + 2x + 7 + x + x + 2x + x + 7 = 22$ $10x + 14 = 22$ $10x = 8$ $x = 0.8$ Area = $2.4 \times 8.6 - 1.6 \times 0.8$ OR $0.8 \times 08 + 2.4 \times 7.8$	19.36 cm ²	5	M1 for attempt to find an expression of the perimeter A1 for $10x + 14 = 22$ A1 for $x = 0.8$ M1 for attempt to find area A1 for 19.36
Total for Question: 5 marks				
4. (a)		-3, -2, -1, 0, 1	2	B2 for -3, -2, -1, 0, 1 (B1 for -2, -1, 0, 1 or -2, -1, 0, 1, 2)
(b)		$-1 < x \leq 3$	2	B2 for $-1 < x \leq 3$ (B1 for $-1 \leq x \leq 3$ or $-1 < x < 3$)
Total for Question: 4 marks				

5MB3H				
Question	Working	Answer	Mark	Additional Guidance
5. OWC (i, iii) FE	For 100 units: N Eastern = £30 Pacific = £20 East Anglian = £20 For 200 units: N Eastern = £30 Pacific = £40 East Anglian = £30 OR Graphs plotted correctly	Correct conclusion with justifying working	5	B1 for calculating 2 correct points for Pacific M1 for attempt find 2 correct points on East Anglian A1 for two correct points on East Anglian M1 for calculating a point that allows a comparison to be made between 100 and 200 units C1 for correct conclusion QWC: Decision must be stated, and all comments should be clear and follow through from working out
Total for Question: 5 marks				
6. FE	$2 \times (62 + 0.50 + 1)$ "127" $\times 1.15$	£146.05	3	M2 for attempt to find cost including VAT e.g. "127" $\times 1.15$ (M1 for VAT = "127" $\times 0.175$ or $\frac{15}{100} \times 127$ or $12.70 + 6.35$) A1 cao
(b)	$71.30 \div 1.15$	£62	2	M1 for $71.30 \div 1.15$ or $71.30 \div 115 \times 100$ A1 cao
(c)		1.02(173913)	2	M1 for $\div 1.15$ or $\times 1.175$ A1 for 1.02(173913)
Total for Question: 7 marks				
7.	$1189 \div 200$ or $891 \div 200$ = 5 and 4 or 20 squares $200^2 \div 2$ = $\sqrt{(200^2 \div 2)}$ = 141.4 Realising that another row of squares of side 141.4 fits or $891 \div 141.4$ = 5 squares	90	5	M1 for attempt to divide $1189 \div 200$ or $891 \div 200$ M1 for $200^2 \div 2$ M1 for $\sqrt{(200^2 \div 2)}$ M1 for realising that another row of squares of side 141.4 fits or $891 \div 141.4$ A1 cao for 90 triangles
Total for Question: 5 marks				

5MB3H		Additional Guidance	
Question	Working	Answer	Mark
8. FE	 $\sin 72 = \frac{3.8}{h}$ $h = \frac{3.8}{\sin 72}$	4 m	4
M1 for drawing sketch of scenario showing all information M1 for $\sin 72 = \frac{3.8}{h}$ or for attempt at scale drawing M1 for $h = \frac{3.8}{\sin 72}$ C1 any ladder over 4.66 m long providing M3 earned NB scale drawing attempt scores a maximum of 2 marks			
Total for Question: 4 marks			
9.	(a) $2 = 2 \times 3.14 \times \sqrt{\frac{l}{9.81}}$ $\sqrt{\frac{l}{9.81}} = \frac{2}{2 \times 3.14}$ $\frac{l}{9.81} = \left(\frac{2}{2 \times 3.14}\right)^2$ $l = 9.81 \times \left(\frac{2}{2 \times 3.14}\right)^2$	0.995	2
M1 for dividing 2 by 2×3.14 and squaring A1 for 0.994(96937) cao			
(b)	$T^2 = 4\pi^2 \frac{l}{g}$ $\frac{T^2}{4\pi^2} = \frac{l}{g}$	$l = \frac{T^2 g}{4\pi^2}$	3
M1 for squaring both sides M1 for dividing by $4\pi^2$ or multiplying by g A1 for $l = \frac{T^2 g}{4\pi^2}$ oe			
Total for Question: 5 marks			

5MB3H				
Question	Working	Answer	Mark	Additional Guidance
10.	$x(x + 3) = (x + 7)(x + 4)$	-3.5	4	M1 for multiplying through by LCD = $(x + 4)(x + 3)$ A1 for $x^2 + 3x = x^2 + 11x + 28$ B1 for $-28 = 8$ A1 cao
Total for Question: 4 marks				
11.	(a) $78 - 65 = 13$ $\frac{DB}{\sin 65} = \frac{50}{\sin 13}$ $DB = \frac{50}{\sin 13} \times \sin 65$ (=201..) "201" $\times \sin 78$	197 m	6	B1 for 13° M1 for $\frac{DB}{\sin 65} = \frac{50}{\sin 13}$ M1 for $DB = \frac{50}{\sin 13} \times \sin 65$ A1 for 201 – 201.5 M1 for "201" $\times \sin 78$ A1 for 196.6 – 197.1 OR B1 for 13° M1 for $\frac{AD}{\sin 102} = \frac{50}{\sin 13}$ M1 for $AD = \frac{50}{\sin 13} \times \sin 102$ A1 for 217 – 217.42 M1 for "217" $\times \sin 65$ A1 for 196.6 – 197.1
Total for Question: 6 marks				

5MB3H			
Question	Working	Answer	Mark
12.	$15x + 10y = 55$ $4x - 10y = 40$ $19x = 95$ $x = 5$ $15 + 2y = 11$ $2y = -4$ $y = -2$	$x = 5$ $y = -2$	4
<p style="text-align: right;">Additional Guidance</p> <p>M1 for correct multiplication and use of correct operation to eliminate either x or y, condone one arithmetical error A1 for either $x = 5$ or $y = -2$ M1 (dep) for substitution of found variable into either equation A1 for correct value of 2nd variable OR M1 Correct rearrangement of 1 equation and substitution into 2nd equation A1 for either $x = 5$ or $y = -2$ M1 (dep) for substitution of found variable into either equation A1 for correct value of 2nd variable OR M1 for one line drawn M1 for second line drawn A1 for $x = 5$ A1 for $y = -2$ (SC : If no method marks awarded, score B1 for one value correct)</p> <p style="text-align: right;">Total for Question: 4 marks</p>			
13.	$\frac{-2 \pm \sqrt{2^2 - 4 \times 3 \times -4}}{2 \times 3}$ $= \frac{-2 \pm \sqrt{52}}{6}$ <p>OR</p> $3\left(x + \frac{1}{3}\right)^2 - \frac{13}{3} = 0$ $\left(x + \frac{1}{3}\right)^2 = \frac{13}{9}$	0.869 -1.54	3
<p>M1 for $\frac{-2 \pm \sqrt{2^2 - 4 \times 3 \times -4}}{2 \times 3}$ allow substitution of $c = \pm 4$ M1 for $\frac{-2 \pm \sqrt{52}}{6}$ A1 for 0.869 and -1.54 OR M1 for $3\left(x + \frac{1}{3}\right)^2 - \frac{13}{3} = 0$ M1 for $\left(x + \frac{1}{3}\right)^2 = \frac{13}{9}$ A1 for 0.869 and -1.54 Trial and improvement: M1 correct set of trials A1 for 0.869 and -1.54</p> <p style="text-align: right;">Total for Question: 3 marks</p>			

5MB3H			
Question	Working	Answer	Mark
14. FE	$\frac{(29.95 \times 14.95 \times 7.95)^3}{\frac{4}{3}\pi(0.255)^3}$ $= \frac{3559.632375}{0.0694559011 \cdot 8}$	£462.25	6
Additional Guidance			
B1 for using the least value of 1 dimension of the cuboid M1 for $29.95 \times 14.95 \times 7.95$ oe B1 for using greatest radius of sphere as $0.25\text{cm} + 0.005$ cm M1 for dividing least volume of lead "3559.632375" by greatest volume of sphere "0.0694559" A1 for 51250 or Selling price = £51.25 A1 for Profit = £1.25 cao			
Total for Question: 6 marks			

5MB3H		Working	Answer	Mark	Additional Guidance
15. QWC (i, ii, iii)		Join AO and produce to P Mark equal angles in isosceles triangle AOC or AOB Mark angle COP as twice angle CAO or mark angle BOP as twice angle BAO Identify angle A as half angle BOC		4	M1 for Joining AO and producing to "P" M1 for marking equal angles in isosceles triangle AOC or AOB giving reason that triangles are isosceles because radii are equal M1 for marking angle COP as twice angle CAO or marking Angle BOP as twice angle BAO giving reason that exterior angle of a triangle is equal to the interior and opposite angles o.e. QWC: Working should be logical and sequential in structure; following on from labelling the extended line A1 for Identifying angle A as half angle BOC if M3 awarded QWC: All labelling and angle notation should be consistent
Total for Question: 4 marks					
16.	(a)	$-6b - 6a + 12b$	$6b - 6a$	1	B1 cao
QWC (ii, iii)	(b)	$\vec{BC} = -6b - 6b + 12b = 6b - 6a$ $\vec{CY} = 4b - 4a$ $\vec{OX} = 12b - 3a$ $\vec{OY} = 12b + 4b - 4a = 16b - 4a$ $\vec{OX} : \vec{OY} = 3 : 4$		4	M1 for attempt to find \vec{CY} or sign of $\frac{2}{3}(6b - 6a)$ M1 for attempt to find \vec{OX} or sign of $12b - 3a$ M1 for attempt to find \vec{OY} or sign of $12b + 4b - 4a$ A1 for $OX : OY = 3 : 4$ shows that OX and OY are co-linear QWC: labelling must be consistent and correct
Total for Question: 5 marks					
17.	(a)		$(1, 5)$ $(3, 2)$	2	B1 cao B1 cao
	(i)				
	(ii)				
	(b)		Reflection in x axis	1	B1 cao
Total for Question: 3 marks					

5MB3H				
Question	Working	Answer	Mark	Additional Guidance
18.	$\frac{120}{360} \times 2\pi \times 10.3 = 21.572$ $"21.572" \div 2\pi = 3.4333$ $\sqrt{(10.3^2 - 3.433^2)}$	9.71	4	M1 for Length of arc = $\frac{120}{360} \times 2\pi \times 10.3$ M1 for Radius of circle = "21.572" $\div 2\pi$ M1 for $\sqrt{(10.3^2 - 3.433^2)}$ A1 cao
Total for Question: 4 marks				