

Higher Grade Unit Tests

Marking Scheme - UNIT 2

	Give 1 mark for each •	Illustration for awarding each mark
1	D	Award 2 marks for each correct answer 10 marks
2	B	
3	B	
4	C	
5	A	
6	ans: -82.4 (6 marks) 1 prepares to integrate 2 integrates first term 3 integrates second term 4 substitutes values 5 evaluates each bracket 6 answer	$\int_4^9 x^{-\frac{1}{2}} - x^{\frac{3}{2}} dx$ $2x^{\frac{1}{2}} \dots\dots\dots$ $\dots\dots\dots \frac{2}{5}x^{\frac{5}{2}}$ $\left[2(9)^{\frac{1}{2}} - \frac{2}{5}(9)^{\frac{5}{2}} \right] - \left[2(4)^{\frac{1}{2}} - \frac{2}{5}(4)^{\frac{5}{2}} \right]$ $(6 - 97.2) - (4 - 12.8)$ -82.4
7(a)	ans: proof (2 marks) 1 knows to use synthetic division 2 makes statements about remainder	$\begin{array}{r rrrr} 3 & 2 & -3 & -11 & 6 \\ & & 6 & 9 & -6 \\ \hline & 2 & 3 & -2 & 0 \end{array}$ since remainder = 0, (x - 3) is a factor
(b)	ans: x = 3; 0.5; -2 (3 marks) 1 interprets table 2 completes factorising 3 solves	$(x - 3)(2x^2 + 3x - 2) = 0$ $(x - 3)(2x - 1)(x + 2) = 0$ $x = 3; 0.5; -2$
8	ans: (x + 2)² + (y - 1)² = 61 (3 marks) 1 finds midpoint of PQ 2 finds radius 3 substitutes into equation	midpoint PQ = (-2, 1) $r^2 = 36 + 25 = 61$ $(x + 2)^2 + (y - 1)^2 = 61$

	Give 1 mark for each •	Illustration(s) for awarding each mark
9	ans: $\frac{\partial}{6}; \frac{5\partial}{6}$ (5 marks) $\frac{1}{-}$ multiplies brackets and substitutes $\frac{2}{-}$ simplifies to quadratic in $\sin x$ $\frac{3}{-}$ factorises $\frac{4}{-}$ solves and discards $\frac{5}{-}$ finds angles	$\frac{1}{-}$ $2(1 - 2\sin^2 x) + 8\sin x = 5$ $\frac{2}{-}$ $4\sin^2 x - 8\sin x + 3 = 0$ $\frac{3}{-}$ $(2\sin x - 1)(2\sin x - 3) = 0$ $\frac{4}{-}$ $\sin x = \frac{1}{2}$ or $\sin x = \frac{3}{2}$ (discard) $\frac{5}{-}$ $x = \frac{\pi}{6}; \frac{5\pi}{6}$
10(a)	ans: proof (2 marks) $\frac{1}{-}$ substitutes point into equation $\frac{2}{-}$ shows both sides equal	$\frac{1}{-}$ $(-1)^2 + (-8)^2 + 4 - 64 - 5$ $\frac{2}{-}$ $1 + 64 + 4 - 64 - 5 = 0$; point lies on circle
(b)	ans: $4y + 3x = -35$ (4 marks) $\frac{1}{-}$ finds centre of circle $\frac{2}{-}$ finds gradient of radius $\frac{3}{-}$ finds gradient of tangent $\frac{4}{-}$ substitutes into equation	$\frac{1}{-}$ $(2, -4)$ $\frac{2}{-}$ $m = \frac{4}{3}$ $\frac{3}{-}$ $m_{\tan} = -\frac{3}{4}$ $\frac{4}{-}$ $y + 8 = -\frac{3}{4}(x + 1)$
11	ans: (3, -1) (5 marks) $\frac{1}{-}$ rearranges to $y = mx + c$ $\frac{2}{-}$ substitute in circle equation $\frac{3}{-}$ multiplies brackets and rearranges $\frac{4}{-}$ proves tangency $\frac{5}{-}$ finds point of contact	$\frac{1}{-}$ $y = 3x - 10$ $\frac{2}{-}$ $x^2 + (3x - 10)^2 = 10$ $\frac{3}{-}$ $10(x^2 - 6x + 9) = 0$ $\frac{4}{-}$ $10(x - 3)^2 = 0$..one root / $b^2 - 4ac = 0$ $\frac{5}{-}$ $(3, -1)$
		Total: 40 marks