

Differentiation 1 Homework - Marking Scheme

Question	Main points of expected responses	
1 (a)	any 2 correct , another 2	• ^{1,2} $4x^3 - 6x^2 + 8x + 1$
1 (b)	Expand bracket differentiation	• ^{3,4} $17x^2 + 4x - 12$ $2x + 4$
1 (c)	2 correct , another 2	• ^{5,6} $\frac{x^{-5}}{3}$ $\frac{-5x^{-6}}{3}$
2 (a)	Format Correct Differentiation	• ¹ $4x^{-\frac{2}{3}}$ • ² $\frac{-8}{3\sqrt[3]{x^5}}$ OR $\frac{-8x^{-\frac{5}{3}}}{3}$
2 (b)	Format Correct Differentiation	• ³ $x^{-\frac{5}{2}} - 2x^{-3}$ • ⁴ $-\frac{5}{2}x^{-\frac{7}{2}} + 6x^{-4}$ OR $-\frac{5}{2\sqrt{x^7}} + \frac{6}{x^4}$
2 (c)	Format Any one Correct All Correct	• ⁵ $x^{-\frac{1}{2}} + 2x^{\frac{1}{5}}$ • ⁶ $-\frac{1}{2\sqrt{x^3}}$ OR $-\frac{1}{2}x^{-\frac{3}{2}} + \frac{2}{5}x^{-\frac{4}{5}}$ • ⁷ $+\frac{2}{5}x^{-\frac{4}{5}}$ OR $+\frac{2}{5\sqrt[5]{x^4}}$
3	Format Correct Differentiation Substitution and Answer	• ¹ $-3x^{-2}$ • ² $6x^{-3}$ OR $\frac{6}{x^3}$ • ³ $\frac{6}{2^3} \rightarrow \frac{3}{4}$
4	Differentiation Gradient Coordinate Equation	• ¹ $f'(x) = 3x^2 + 2$ • ² $m = 5$ • ³ $(-1, -2)$

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		<ul style="list-style-type: none"> •⁴ $y + 2 = 5(x + 1)$
5	<ul style="list-style-type: none"> •¹ Initial Substitution •² Answer •³ Initial Substitution •⁴ Answer 	<ul style="list-style-type: none"> •¹ $f(\cos x)$ •² $2\cos x$ •³ $g(2x)$ •⁴ $\cos 2x$
6	<ul style="list-style-type: none"> •¹ Rearrange •² Two solutions for $2x$ •³ All solutions for $2x$ •⁴ Answer 	<ul style="list-style-type: none"> •¹ $\tan(2x) = \frac{1}{\sqrt{3}}$ •^{2,3} $2x = \frac{\pi}{6}, \frac{7\pi}{6}, \frac{13\pi}{6}, \frac{19\pi}{6}$ •⁴ $x = \frac{\pi}{12}, \frac{7\pi}{12}, \frac{13\pi}{12}, \frac{19\pi}{12}$

Total 28 marks