

Functions & Graphs Homework 2 - Marking Scheme

Question	Main points of expected responses	
1 (a)	<ul style="list-style-type: none"> •¹ $f(2)$ •² $g(6)$ •³ $g(-1)$ •⁴ $f(-4)$ 	<ul style="list-style-type: none"> •¹ 6 •² 17 •³ -4 •⁴ 12
1 (b)	<ul style="list-style-type: none"> •^{1,2} Answer and tidy •^{3,4} Answer and tidy •^{5,6} Answer and tidy 	<ul style="list-style-type: none"> •^{1,2} $f(g(x)) = (3x - 1)^2 + (3x - 1)$ $= 9x^2 - 3x$ •^{3,4} $g(f(a)) = 3(a^2 + a) - 1$ $= 3a^2 + 3a - 1$ •^{5,6} $f(f(k)) = (k^2 + k)^2 + (k^2 + k)$ $= k^4 + 2k^3 + 2k^2 + k$
2 (a)	Answer	<ul style="list-style-type: none"> •¹ $g(f(x)) = \frac{(\)^2+1}{(\)^2-1}$ •² $g(f(x)) = \frac{(2x-1)^2+1}{(2x-1)^2-1}$
2 (b)	<ul style="list-style-type: none"> •¹ Denominator = 0 •² Factorise and answer 	<ul style="list-style-type: none"> •¹ $4x^2 - 4x = 0$ •² $4x(x - 1) = 0 \quad x = 0 \quad x = 1$
3 (i)	<ul style="list-style-type: none"> •¹ Shape •² Coordinates 	<ul style="list-style-type: none"> •¹ •² <p>The graph shows a curve passing through the points (0, 1) and (1, 2) on a Cartesian coordinate system. The x-axis and y-axis are labeled with values 2, 4, and 6. The curve is increasing and passes through the point (0, 1).</p>
3 (ii)	<ul style="list-style-type: none"> •³ Shape •⁴ Coordinates 	<ul style="list-style-type: none"> •¹ •² <p>The graph shows a curve passing through the points (0, 4) and (1, 5) on a Cartesian coordinate system. The x-axis and y-axis are labeled with values 2, 4, and 6. The curve is increasing and passes through the point (0, 4).</p>

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3 (iii)	<ul style="list-style-type: none"> •⁵ Shape •⁶ Coordinates 	<ul style="list-style-type: none"> •⁵ •⁶
4	<ul style="list-style-type: none"> •¹ Shape •² Coordinates 	<ul style="list-style-type: none"> •¹ •²
5 (i)	<ul style="list-style-type: none"> •¹ Sketch with Max and Mini Crossover on x-axis 	<ul style="list-style-type: none"> •¹
5 (ii)	<ul style="list-style-type: none"> •¹ Sketch 3 cycles •² Max and Mini ± 2 	<ul style="list-style-type: none"> •³ •⁴
5 (iii)	<ul style="list-style-type: none"> •¹ Sketch Max and Mini ± 4 •² Move down 1 unit 	<ul style="list-style-type: none"> •⁴ •⁵
6	<ul style="list-style-type: none"> •¹ Gradient •² Perpendicular Gradient •³ Equation 	<ul style="list-style-type: none"> •¹ $m_{QR} = -\frac{1}{8}$ •² $m_{perp} = 8$ •³ $y - 1 = 8(x + 1)$

Total 30 marks