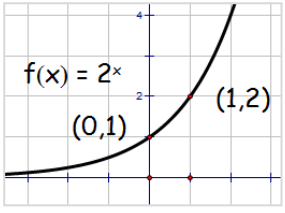
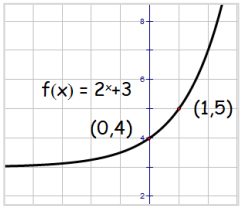
Functions & Graphs Homework 2 - Marking Scheme

Question	Main points of expected responses	
1 (a)	•[1] $f(2)$ •[2] $g(6)$ •[3] $g(-1)$ •[4] $f(-4)$	•[1] 6 •[2] 17 •[3] -4 •[4] 12
1 (b)	•[1,2] Answer and tidy •[3,4] Answer and tidy •[5,6] Answer and tidy	•[1, 2] $\boldsymbol{f(g(x)) = (3x-1)^2 + (3x-1)}$ $\boldsymbol{= 9x^2 - 3x}$ •[3, 4] $\boldsymbol{g(f(a)) = 3(a^2 + a) - 1}$ $\boldsymbol{= 3a^2 + 3a - 1}$ •[5,6] $\boldsymbol{f(f(k)) = (k^2 + k)^2 + (k^2 + k)}$ $\boldsymbol{= k^4 + 2k^3 + 2k^2 + k}$
2 (a)	Answer	•[1] $\boldsymbol{g(f(x)) = \frac{(\quad)^2+1}{(\quad)^2-1}}$ •[2] $\boldsymbol{g(f(x)) = \frac{(2x-1)^2+1}{(2x-1)^2-1}}$
2 (b)	•[1] Denominator $= 0$ •[2] Factorise and answer	•[1] $\boldsymbol{4x^2 - 4x = 0}$ •[2] $\boldsymbol{4x(x-1) = 0 \quad x = 0 \quad x = 1}$
3 (i)	•[1] Shape •[2] Coordinates	•[1] •[2] 
3 (ii)	•[3] Shape •[4] Coordinates	•[1] •[2] 

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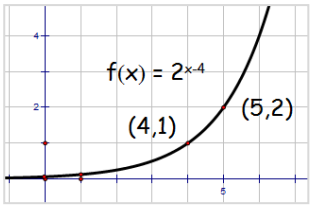
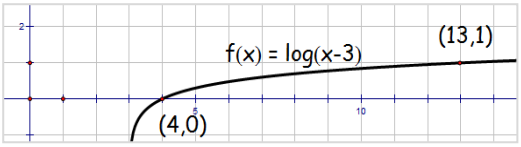
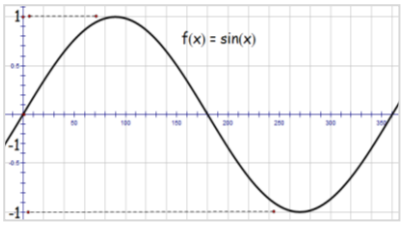
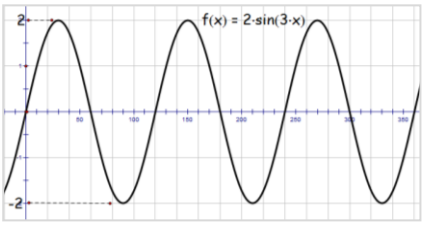
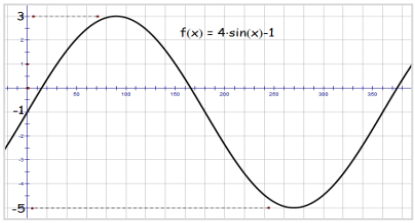
3 (iii)	•5 Shape •6 Coordinates	•5 •6 
4	•1 Shape •2 Coordinates	•1 •2 
5 (i)	•1 Sketch with Max and Mini Crossover on x-axis	•1 
5 (ii)	•1 Sketch 3 cycles •2 Max and Mini ± 2	•3 •4 
5 (iii)	•1 Sketch Max and Mini ± 4 •2 Move down 1 unit	•4 •5 
6	•1 Gradient •2 Perpendicular Gradient •3 Equation	•1 $m_{QR} = -\frac{1}{8}$ •2 $m_{perp} = 8$ •3 $y - 1 = 8(x + 1)$

Total 30 marks