

Q4	Model Solution – 25 Marks	Marking Notes
(a)	$1 - \frac{2}{(x+4)} + \frac{x-8}{(x-2)(x+4)}$ $\frac{(x-2)(x+4)}{(x-2)(x+4)} - \frac{2(x-2)}{(x-2)(x+4)} + \frac{x-8}{(x-2)(x+4)}$ $\frac{x^2 + 2x - 8 - 2x + 4 + x - 8}{(x-2)(x+4)}$ $\frac{x^2 + x - 12}{(x-2)(x+4)}$ $\frac{(x-3)(x+4)}{(x-2)(x+4)}$ $f(x) = \frac{x-3}{x-2}$	<p>MS (0, 4, 7, 8, 10)</p> <p>LPC: Correct common denominator or correct simplified numerator or attempt to find both with one mistake</p> <p>MPC: Correct common denominator and correct simplified numerator</p> <p>HPC: Correct factorised numerator and denominator</p>
(b)	$g(x) = \frac{e^x - 3}{e^x - 2}$ $u = e^x - 3 \quad v = e^x - 2$ $du = e^x \quad dv = e^x$ $g'(x) = \frac{e^x(e^x - 2) - e^x(e^x - 3)}{(e^x - 2)^2}$ $g'(x) = \frac{e^{2x} - 2e^x - e^{2x} + 3e^x}{(e^x - 2)^2}$ $g'(x) = \frac{e^x}{(e^x - 2)^2}$	<p>MS (0, 5, 8, 10)</p> <p>LPC: Some correct use of the quotient rule</p> <p>HPC: Fully correct use of the quotient rule</p>
(c)	$1 = \frac{e^x}{(e^x - 2)^2}$ $(e^x - 2)^2 = e^x$ $e^{2x} - 4e^x + 4 = e^x$ $e^{2x} - 5e^x + 4 = 0$ $(e^x - 1)(e^x - 4) = 0$ $e^x = 1, x = \ln 1$ $e^x = 4, x = \ln 4$	<p>MS (0, 2, 3, 4, 5)</p> <p>LPC: Some correct expansion leading to an equation in e^x</p> <p>MPC: Correctly factorising their equation in e^x</p> <p>HPC: Correct e^xs</p>