Question	Answer	Marks	Partial marks
1(a)	$-3(x + 2)^2 + 31$	**B4**	**B2** for $-3(x + 2)^2$ or **B1** for $(x + 2)^2$ or $a = -3$ and $b = 2$ **B2** for $c = 31$ or **B1** for $-4 \times -3 + 19$ soi
1(b)	Maximum value 31 when $x = -2$	**B2**	**Strict FT** *their c* from part **(a)** and **–***their b* from part (**a)** **B1** for either without contradiction
1(c)	$-3\left(\sqrt{u}+2\right)^2 = -31$ oe	**M1**	**FT** an expression of correct form from part (**a)**
	Rearranges as far as $\sqrt{u} = -2 \pm \sqrt{\frac{31}{3}}$	**A1**	
	1.48 cao or 1.475[13…] rot to 3 or more dp or $\frac{43-4\sqrt{93}}{3}$ isw	**A1**	
2	Correct method to eliminate *y:* $5x - 3(1 - x) = 2$ oe or adds $3x + 3\ln y = 3$ $5x - 3\ln y = 2$ to obtain $3x + 5x = 3 + 2$ or better	**M1**	
	$x = \frac{5}{8}$ oe	**A1**	
	$\ln y = \frac{3}{8}$ oe	**M1**	
	$y = e^{\frac{3}{8}}$ oe or 1.45	**A1**	

Question	Answer	Marks	Partial marks
2	**Alternative method**		
	Correct method to eliminate x: $5(1 - \ln y) - 3\ln y = 2$ oe or subtracts $5x - 3\ln y = 2$ from $5x + 5\ln y = 5$ to obtain $5\ln y - (-3\ln y) = 5 - 2$ or better	**(M1)**	
	$\ln y = \frac{3}{8}$ oe	**(M1)**	
	$y = e^{\frac{3}{8}}$ oe or 1.45	**(A1)**	
	$x = \frac{5}{8}$ oe	**(A1)**	
3(a)	$2x^2 + 5x - \frac{1}{2}\ln(2x+3) + c$ oe	**B3**	**B2** for $2x^2 + 5x - \frac{1}{2}\ln(2x+3)$ or $2x^2 + 5x - \frac{1}{2}\ln 2x + 3 + c$ or $2x^2 + 5x + k\ln(2x+3) + c$ with $k \neq 0$ or **B1** for $2x^2 + 5x + \ldots + c$ or $\ldots - \frac{1}{2}\ln 2x + 3$ or $\ldots + k\ln(2x+3)$ with $k \neq 0$
3(b)	Substitutes limits and subtracts in correct order	**M1**	**FT** *their* part (a) providing it includes a term $k\ln(2x+3)$ with $k \neq 0$
	$\left[18 + 15 - \frac{1}{2}\ln 9\right] - \left[2 + 5 - \frac{1}{2}\ln 5\right]$	**A1**	
	$26 - \frac{1}{2}\ln\frac{9}{5}$ or $26 + \frac{1}{2}\ln\frac{5}{9}$ oe	**A1**	