Question	Answer	Marks	Guidance
9	When $x = 0,\ y = \ln 2$ soi	**B1**	May be implied in later work
	$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{(x+1)\frac{6x}{\left(3x^2+2\right)} - \ln\left(3x^2+2\right)}{(x+1)^2}$	**3**	**B1** for $\frac{6x}{\left(3x^2+2\right)}$ allow when seen **M1** for attempt at a quotient or product **A1** for all other terms apart from $\frac{6x}{\left(3x^2+2\right)}$ correct
	When $x = 0, \frac{\mathrm{d}y}{\mathrm{d}x} = -\ln 2$	**M1**	**Dep** on previous **M** mark for attempt to find the gradient using *their* $\frac{\mathrm{d}y}{\mathrm{d}x}$
	Equation of normal: $y - \ln 2 = \frac{1}{\ln 2}x$	**M1**	For attempt at a normal equation using *their y* (not 3 ln2) and $-\frac{1}{\textit{their}\left(-\ln 2\right)}$, must be from an attempt at differentiation
	When $y = 0,\ x = -(\ln 2)^2$	**M1**	For attempt to find the value of x when $y = 0$ using *their* normal equation
	Gradient $BC = \frac{3\ln 2}{(\ln 2)^2}$	**M1**	**Dep** on both previous **M** marks
	$\frac{3}{\ln 2}$ or $3(\ln 2)^{-1}$	**A1**	Must have correct exact working throughout

Question	Answer	Marks	Guidance
10(a)(i)	xy^2 soi	**B1**	Simplification of the left-hand side of the first equation
	$1 = \lg 10$ soi	**B1**	Simplification of right-hand side of equation
	$x - 3\left(\frac{10}{x}\right) = 13$	**M1**	For substitution of y^2 into linear equation oe and attempt to simplify
	$x^2 - 13x - 30 = 0$	**A1**	**AG** – must see sufficient detail to justify the given answer
	Alternative $y^2 = \frac{(x-13)}{3}$	**(B1)**	
	$\lg x + \lg \frac{(x-13)}{3} = 1$	**(M1)**	For attempt at substitution in the log equation
	$\frac{x(x-13)}{3} = 10$ oe	**(B1)**	
	$x^2 - 13x - 30 = 0$	**(A1)**	**AG** – must see sufficient detail to justify the given answer
10(a)(ii)	$x = 15$ only	**B1**	
	$y = \sqrt{\frac{2}{3}}$ or $\frac{\sqrt{6}}{3}$ or exact equivalent only	**B1**	isw once exact value seen
10(b)	$\log_a x + \frac{3}{\log_a x}$ or $\frac{1}{\log_x a} + 3\log_x a$	**B1**	For an appropriate change of base
	$(\log_a x)^2 - 4\log_a x + 3 = 0$ or $3(\log_x a)^2 - 4\log_x a + 1 = 0$	**M1**	For an attempt to obtain a 3-term quadratic equation in terms of $\log_a x$ or $\log_x a$, equated to zero.
	$\log_a x = 3 \quad \log_a x = 1$ or $\log_x a = \frac{1}{3}, \quad \log_x a = 1$	**M1**	**Dep** on previous **M** mark for correct solution of *their* quadratic equation
	$x = a$	**A1**	Must be from completely correct work
	$x = a^3$	**A1**	Must be from completely correct work