Question	Answer	Marks	Partial Marks
8(c)	no real value for $\log_2(-4)$ or $\log_2(-4+2)$	**B1**	must identify specific term in one of original equations and use $x = -4$
	$y=1$	**B1**	
9(a)	$(AC=)\ \sqrt{300^2+x^2}$ seen isw	**B1**	
	time for $AC=\dfrac{\sqrt{300^2+x^2}}{0.9}$ oe or time for $CD=\dfrac{400-x}{1.5}$ oe	**M1**	using clearly indicated value for *their AC* or *their CD*
	$T=\dfrac{\sqrt{300^2+x^2}}{0.9}+\dfrac{400-x}{1.5}$ oe seen isw	**A1**	
9(b)	$\dfrac{\mathrm{d}T}{\mathrm{d}x}=\dfrac{1}{2}\dfrac{\left(300^2+x^2\right)^{-\frac{1}{2}}}{0.9}\times 2x\ -\dfrac{2}{3}$ oe	**B2**	accept unsimplified; if incorrect allow B1 for correct differentiation of $\left(300^2+x^2\right)^{\pm\frac{1}{2}}$
	set *their* $\dfrac{\mathrm{d}T}{\mathrm{d}x}=0$	**M1**	$\dfrac{\mathrm{d}T}{\mathrm{d}x}$ must be a function of x
	$25x^2=9\left(300^2+x^2\right)$ oe	**A1**	equation in x^2 with square root removed
	$x=225$ (m)	**A1**	
	$T=533$ (s) or 1600/3 (exact value)	**A1**	or 8 min 53 s
10(a)	use S_4 or S_8	**M1**	
	$S_4=\dfrac{4}{2}[2a+3d]=38\quad(2a+3d=19)$	**A1**	accept unsimplified
	$S_8=\dfrac{8}{2}[2a+7d]=38+86\ (2a+7d=31)$ or $S_8-S_4=\dfrac{8}{2}[2a+7d]-\dfrac{4}{2}[2a+3d]=86$ $(4a+22d=86)$	**A1**	accept unsimplified
	solve correct equations for a or d	**M1**	
	$a=5$ and $d=3$	**A1**	