

Q	Marking instructions	AO	Marks	Typical solution
9(a)	Obtains $y = 10.2$ or $y = \frac{11}{3}$ OE AWFW [3.6, 3.7] for $\frac{11}{3}$	3.4	B1	When $t = 0.2$, $y = 10.2$ $t = 3$, $y = \frac{11}{3}$ $10.2 - \frac{11}{3} = 6.53 < 7$
	Finds the difference between their two values of y	1.1b	M1	The slide is safe.
	Makes a comparison between 6.53 and 7 and states that the safety requirement is met. For 6.53, accept AWFW [6.5, 6.53] OE	3.2a	R1	
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
9(b)(i)	Obtains $1+t^{-2}$ or $1-2t^{-2}$ OE Ignore labels	1.1b	B1	$\frac{dx}{dt} = 1+t^{-2}$ $\frac{dy}{dt} = 1-2t^{-2}$
	Uses chain rule to obtain $\frac{dy}{dx}$ using their $\frac{dx}{dt}$ and $\frac{dy}{dt}$ Condone missing brackets	1.1a	M1	$\frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx}$ $\frac{dy}{dx} = \frac{1-2t^{-2}}{1+t^{-2}}$
	Obtains a correct expression ISW	1.1b	A1	
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
9(b)(ii)	Forms equation for appropriate derivative equal to zero. Their $\frac{dy}{dx} = 0$ or their $\frac{dy}{dt} = 0$	3.1a	M1	$1 - 2t^{-2} = 0$ $t^2 = 2$ $t = \sqrt{2}$ $y = \sqrt{2} + \frac{2}{\sqrt{2}}$ $= 2\sqrt{2}$ Length of RS = 2.83 metres
	Obtains $t = \sqrt{2}$ Allow 1.4 or better for $\sqrt{2}$ $t = \sqrt{2}$ must come from correct $\frac{dy}{dx}$ or $\frac{dy}{dt}$ PI by substituting $\sqrt{2}$ into y	1.1b	A1	
	Substitutes their value for t into y and obtains a value for y provided $0.2 < t < 3$	3.4	M1	
	Obtains correct length with unit e.g $2\sqrt{2}$ metres or 2.8 metres or or AFWW [2.82, 2.83] metres Allow equivalent correct length in different units Do not ignore subsequent incorrect rounding	3.2a	A1	
Subtotal			4	

Q	Marking instructions	AO	Marks	Typical solution
9(b)(iii)	States $\tan \theta =$ value of their $\frac{dy}{dx}$ at $t = 3$ OE PI by correct answer or 0.61 or better or 55°	3.1a	M1	When $t = 3$, $\frac{dy}{dx} = 0.7$ $\tan \theta = 0.7$ $\theta = 35^\circ$
	Obtains 35° CAO	3.2a	A1	
Subtotal			2	

Question 9 Total			12	
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