

Question		Scheme	Marks	AOs
1.(a)		$14.7 = -14.7 + 9.8T$ or $0 = 14.7T - \frac{1}{2} \times 9.8T^2$ or $0 = 14.7 - 9.8 \times \left(\frac{1}{2}T\right)$ oe	M1	3.4
		$T = 3$	A1	1.1b
			(2)	
(b)		$s_1 = \frac{(14.7+0)}{2} \times 1.5$ (11.025 or $\frac{441}{40}$)	M1	1.1b
		$s_2 = \frac{1}{2} \times 9.8 \times 2.5^2$ (30.625 or $\frac{245}{8}$) OR $s_3 = 14.7 \times 1 + \frac{1}{2} \times 9.8 \times 1^2$ (19.6 or $\frac{98}{5}$) OR $-s_3 = 14.7 \times 4 - \frac{1}{2} \times 9.8 \times 4^2$ (- 19.6) (allow omission of – on LHS)	M1	1.1b
		Total distance = $s_1 + s_2$ OR $2s_1 + s_3$	M1	2.1
		= 41.7 m or 42 m	A1	1.1b
			(4)	
(c)		e.g. Take account of the dimensions of the stone (e.g. allow for spin), do not model the stone as a particle, use a more accurate value for g	B1	3.5c
			(1)	
(7 marks)				
Notes: If they use $g = 9.81$ or 10, penalise once for whole question.				
1a	M1	Complete method to find T , condone sign errors (M0 if they only find time to top)		
	A1	$T = 3$ correctly obtained.		
1b	M1	Complete method to find one key distance		
	M1	Correct method to find another key distance		
	M1	Complete method to find the total distance		
	A1	41.7 or 42 (after use of $g = 9.8$)		
1c	B1	B0 if there are incorrect extra refinements but ignore extra incorrect statements.		