Q	Marking Instructions	AO	Marks	Typical Solution
11(a)(i)	Substitutes $y = 0$ to give a quadratic equation (PI)	3.1b	M1	$0 = -0.0125x^2 + 0.5x - 2.55$
	Solves quadratic equation	1.1b	M1	$x^2 - 40x + 204 = 0$ $(x - 6)(x - 34)$
	Selects lower root to obtain the correct value of a. Condone x=6 if clearly chosen.	3.2a	A1	$x = 6$ or 34 $a = 6$
	Subtotal		**3**	
11(a)(ii)	Subtracts their two values for a to find the correct distance travelled ie 28m FT provided both values for their a are positive and the smallest was chosen for a	3.2a	B1F	$34 - 6 = 28$ metres
	Subtotal		**1**	
11(b)	Differentiates, at least one term correct Or Uses the symmetry of the curve (PI)	3.1b	M1	$\frac{dy}{dx} = -0.025x + 0.5$ $-0.025x + 0.5 = 0$
	Sets $\frac{dy}{dx} = 0$ to find maximum Or Identifies that the maximum value will be halfway between 'their' solutions to (a)(i) (PI)	1.1a	M1	$x = 20$ Max height = 2.45 m
	Obtains correct value of $x = 20$ PI by correct value of y	1.1b	A1	
	Substitutes back into y to find the max height = 2.45m CAO must include units	3.2a	A1	
	Subtotal		**4**	

11(c)	Substitutes 11 + a into equation to find y.	3.1b	M1	Using $x = 17$, $y = 2.3375$
	Explains a limitation of the model eg that the model assumes that jet has no size or a size less than 3.75cm **or** Wall has no width or has some width **or** No air resistance	3.5b	E1	I have assumed the jet of water has no size
	Compares correct value with 2.3 to infer that jet passes over wall / fails to pass over the wall. Inference must be consistent with stated assumption. Condone a valid comparison if no assumption given	2.2b	R1	$2.3375 > 2.3$ so passes over the wall
	Subtotal		**3**	
	Question Total		**11**	