

Q	Marking instructions	AO	Marks	Typical solution
16(a)	Differentiates to find expression for acceleration with at least one term correct. PI by -0.08 or 0.08	3.4	M1	$a = 0.16 - 0.12t$
	Obtains a fully correct expression for acceleration. PI by -0.08	1.1b	A1	
	Finds their acceleration of the boat when $t = 2$ FT their expression for a Must have differentiated at least one term. Correct units must be stated.	3.2a	A1F	$a = -0.08 \text{ ms}^{-2}$
	Subtotal		3	

Q	Marking instructions	AO	Marks	Typical solution
16(b)	Integrates v with at least one term correct. PI by 1.96	3.1b	M1	$s = \int v dt$ $= \int 0.9 + 0.16t - 0.06t^2 dt$ $s = 0.9t + 0.08t^2 - 0.02t^3 + c$ $s = 0 \text{ when } t = 0 \text{ so } c = 0$ $s = 0.9(2) + 0.08(4) - 0.02(8)$ $\text{Displacement} = 1.96 \text{ m}$
	Obtains a fully correct integral. Condone omission of constant PI by 1.96	1.1b	A1	
	Substitutes $t = 0$ and $t = 2$ into their expression for s Must have integrated at least one term. PI by 1.96	1.1a	M1	
	Obtains displacement = 1.96 m Condone omission of units	1.1b	A1	
	Subtotal		4	

	Question 16 Total		7	
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