

Q	Marking instructions	AO	Marks	Typical solution
10(a)	Uses side of box is $30 - 2x$	3.1b	M1	$C = x(30 - 2x)^2$ $= x(900 - 120x + 4x^2)$ $C = 900x - 120x^2 + 4x^3$
	Identifies the three dimensions then expands correctly to obtain answer AG	2.1	R1	
	<b>Subtotal</b>		<b>2</b>	

Q	Marking instructions	AO	Marks	Typical solution
10(b)	Differentiates, at least one term correct	1.1a	M1	$\frac{dC}{dx} = 900 - 240x + 12x^2$ <p>For maximum <math>\frac{dC}{dx} = 0</math></p> $x = 5 \text{ or } 15$ <p>however <math>x &lt; 15</math> therefore <math>x = 5</math></p> $\frac{d^2C}{dx^2} = -240 + 24x$ <p>Negative when <math>x = 5</math></p> <p>So maximum at <math>x = 5</math>, <math>C = 2000\text{cm}^3</math></p>
	Obtains correct derivative	1.1b	A1	
	Explains $\frac{dC}{dx}$ must be 0 for turning point (or maximum)	2.4	E1	
	Equates their derivative to 0 and solves to find a value of $x < 15$	1.1a	M1	
	Obtains $x = 5$	1.1b	A1	
	Justifies $x = 5$ is the maximum	2.1	R1	
	States maximum capacity CAO  Condone incorrect or missing units	3.2a	A1	
	<b>Subtotal</b>		<b>7</b>	

	<b>Question Total</b>		<b>9</b>	
--	-----------------------	--	----------	--