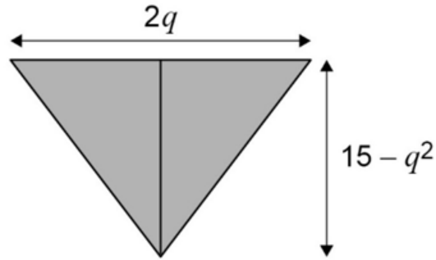
<table>
<tr><th>Q</th><th>Marking instructions</th><th>AO</th><th>Marks</th><th>Typical solution</th></tr>
<tr><td rowspan="3">7(a)</td><td>Identifies the height of the triangle or rectangle as $15-q^2$
PI by $(q, 15-q^2)$, $h=15-q^2$ or $y=15-q^2$ may be indicated on diagram</td><td>3.1a</td><td>M1</td><td rowspan="3">


$A=\frac{1}{2}\times 2q(15-q^2)$
$=15q-q^3$

Since $A=q(15-q^2)>0$
then q's upper limit $c=\sqrt{15}$</td></tr>
<tr><td>Completes rigorous argument to show the given result. It must be clear how they have defined the base and height with use of
$\frac{1}{2}\times 2q(15-q^2)$
for whole triangle
Or
$\left[\frac{1}{2}q(15-q^2)\right]\times 2$ for two half triangles
Or
Explains why the area of the triangle is given by
$q(15-q^2)$ with reference to the rectangle on either side of y-axis</td><td>2.1</td><td>R1</td></tr>
<tr><td>Deduces $c=\sqrt{15}$
ACF</td><td>2.2a</td><td>B1</td></tr>
<tr><td></td><td align="right">Subtotal</td><td></td><td>3</td><td></td></tr>
</table>

Q	Marking instructions	AO	Marks	Typical solution
7(b)	Explains that **maximum** occurs when derivative **equals** 0 Condone incorrect variables in their derivative	2.4	E1	$\frac{dA}{dq} = 15 - 3q^2$ max occurs at $\frac{dA}{dq} = 0$
	Differentiates w.r.t. q At least one term correct	3.1a	M1	$15 - 3q^2 = 0$ $q = \sqrt{5}$
	Obtains $15 - 3q^2$	1.1b	A1	$\frac{\mathrm{d}^2 A}{\mathrm{d}q^2} = -6\sqrt{5} < 0$ so local maximum
	Solves 'their $\frac{\mathrm{d}A}{\mathrm{d}q}$' $= 0$ to find q **and** substitutes to find maximum area	1.1a	M1	$\therefore$ Max area = $15\sqrt{5} - 5\sqrt{5} = 10\sqrt{5}$
	Obtains correct maximum area ACF	1.1b	A1	
	Gives justification for maximum Could be evaluation of second derivative as -13.42…< 0 Or Test of gradient either side, Or Explanation, for example: This must be a max value as only turning point in the interval $0 < q < \sqrt{15}$ **and** the area is 0 at the endpoints	2.4	E1	
	Subtotal		**6**	
	Question 7 Total		**9**	