Q	Marking instructions	AO	Marks	Typical solution
10(a)(i)	Explains the result using $\frac{1}{2}\ ab\ \sin C$ or other trigonometry AG	2.4	E1	Area of a triangle is $\frac{1}{2}\ ab\ \sin C$ Here a and b are both x and $C = 60°$ $A = \frac{1}{2}x^2\frac{\sqrt{3}}{2} = \frac{1}{4}\sqrt{3}x^2$
	Subtotal		**1**	

Q	Marking instructions	AO	Marks	Typical solution
10(a)(ii)	Obtains $3x + 2y = 66$ OE	3.1a	B1	$3x + 2y = 66$ $y = 33 - \frac{3}{2}x$ $xy = (33 - \frac{3}{2}x)x$ $A = (33 - \frac{3}{2}x)x + \frac{1}{4}\sqrt{3}x^2$ $A = 33x - \frac{1}{4}(6 - \sqrt{3})\ x^2$
	Uses their expression for y to give an expression for xy in terms of x ACF	1.1a	M1	
	Completes correct derivation of given formula AG	2.1	R1	
	Subtotal		**3**	

Q	Marking instructions	AO	Marks	Typical solution
10(b)	Differentiates, at least one term correct	1.1a	M1	$\frac{dA}{dx} = 33 - \frac{1}{2}(6 - \sqrt{3})x$
	Obtains correct derivative	1.1b	A1	At a stationary point $\frac{dA}{dx} = 0$
	States that for a stationary (OE) point $\frac{dA}{dx} = 0$ Must state $\frac{dA}{dx} = 0$ not $\frac{dy}{dx} = 0$ but allow use of $\frac{dy}{dx}$ elsewhere	2.4	E1	$33 - \frac{1}{2}(6 - \sqrt{3})x = 0$ $(6 - \sqrt{3})x = 66$ $x = \frac{66}{6 - \sqrt{3}}$ $x = 12 + 2\sqrt{3}$ $\frac{d^2A}{dx^2} = -\frac{1}{2}(6 - \sqrt{3})$ Negative so maximum
	Solves their linear equation = 0 to obtain x PI ACF	1.1a	M1	
	Obtains correct exact value of x ACF	1.1b	A1	
	Differentiates their $\frac{dA}{dx}$ to obtain an expression independent of x Or Tests x values either side of $12 + 2\sqrt{3}$ in $\frac{dA}{dx}$	1.1a	M1	
	Completes reasoned argument to deduce the maximum. Must state that $x = 12 + 2\sqrt{3}$ CSO Can be obtained independently of E1	2.2a	R1	
	Subtotal		**7**	

	Question 10 Total		**11**	