Question number	Scheme	Marks
3 (a)	$\cos(\angle B) = \dfrac{10^2+8^2-12^2}{2\times10\times8} = \dfrac{10^2+6^2-x^2}{2\times10\times6}$	M1 M1
	$\dfrac{20}{160} = \dfrac{136-x^2}{120}$	
	$x^2 = 121$	dM1
	$x = 11$ *	A1 cso (4)
	Alternative Method	
	$\cos(ADB) = \dfrac{x^2+6^2-10^2}{2\times6\times x} = \dfrac{x^2-64}{12x}$	M1
	$\cos(ADC) = \dfrac{x^2+2^2-12^2}{2\times2\times x} = \dfrac{x^2-140}{4x}$	M1
	$\dfrac{x^2-64}{12x} + \dfrac{x^2-140}{4x} = 0$	
	$4x^2 = 484$	dM1
	$x = 11$ *	A1 cso (4)
(b)	Angle ABC / $ABD = \cos^{-1}\left(\dfrac{10^2+8^2-12^2}{2\times10\times8}\right) = 82.8^\circ$	B1 M1
	$\dfrac{1}{2}\times10\times6\times\sin 82.8 = 29.8$	M1 A1 (4) **[8]**
	Alternative Method 1	
	Angle $ADB = \cos^{-1}\left(\dfrac{11^2-64}{12\times11}\right) = 64.42^\circ$	B1 M1
	$\dfrac{1}{2}\times6\times11\times\sin 64.42 = 29.8$	M1 A1 (4)
	Alternative Method 2	
	$\cos ABC = \dfrac{10^2+8^2-12^2}{2\times10\times8} = \dfrac{1}{8}$	B1
	$\sin ABC$ / $ABD = \sqrt{1-\left(\dfrac{1}{8}\right)^2} = \sqrt{\dfrac{63}{64}} = \dfrac{3}{8}\sqrt{7}$	M1
	$\dfrac{1}{2}\times10\times6\times\dfrac{3}{8}\sqrt{7} = 29.8$	M1 A1 (4)

	Notes
(a)	
M1	Use of cosine rule to obtain a correct expression for $\cos(\angle B)$. The correct formula in either form may be used.
M1	Use of cosine rule to obtain a second correct expression for $\cos(\angle B)$. The correct formula in either form may be used.
dM1	Dependant on previous M mark - for solving leading to $x^2 = ...$
A1 cso	For obtaining the given result
	Alternative
M1	Use of cosine rule to obtain a correct expression for $\cos(ADB)$. The correct formula in either form may be used.
M1	Use of cosine rule to obtain a correct expression for $\cos(ADC)$. The correct formula in either form may be used.
dM1	Dependant on previous M mark - for solving leading to $4x^2 = ...$
A1	For obtaining the given result
(b)	
B1	For use of the cosine rule to find angle *B*
M1	For $\cos^{-1}\left(\frac{10^2 + 8^2 - 12^2}{2 \times 10 \times 8}\right)$ oe
M1	Use of $\frac{1}{2}ab\sin C$ (correct for their angle)
A1	29.8
	Alternative 1
B1	For use of the cosine rule to find angle *ADB*
M1	For $\cos^{-1}\left(\frac{11^2 - 64}{12 \times 11}\right)$ oe
M1	Use of $\frac{1}{2}ab\sin C$ (correct for their angle)
A1	29.8
	Alternative 2
B1	For use of the cosine rule to find cos *B*
M1	Use of $\sin^2 A + \cos^2 A = 1$
M1	Use of $\frac{1}{2}ab\sin C$ (correct for their angle)
A1	29.8