16	$\frac{1}{2}\times 45\times 36\times \sin' C'$ (= 405)	**alternative** $\frac{2\times 405}{36}(=22.5)$ **or** $\frac{2\times 405}{45}(=18)$		5	M1 correct substitution into the sine area formula, with their choice of symbol to represent *C*. **or** work out the perpendicular height with *BC* or *CD* as the base.
	$\sin' C' = \left(\frac{405\times 2}{45\times 36}\right)\left('C' = 30\right)$ oe	$\sqrt{45^2 - 22.5^2}\left(=\sqrt{1518.75} = 38.97\right)$ or $\sqrt{36^2 - 18^2}\left(=\sqrt{972} = 31.17\right)$			M1 correct rearrangement to make sin *C* the subject **or** use Pythagoras with their found perpendicular height.
	$(BD =)\sqrt{45^2 + 36^2 - 2\times 45\times 36\times \cos' 30'}$ $\left(=\sqrt{3321 - 3240\times \cos' 30'}\right)$ $\left(=\sqrt{515.077...} = 22.695...\right)$	$\sqrt{('38.97' - 36)^2 + 22.5^2}\left(=\sqrt{515.077...}\right)$ or $\sqrt{('45' - 31.17)^2 + 18^2}\left(=\sqrt{515.077...}\right)$			M1 (dep on 1st M1, ft 30) correct expression for *BD* ft their *C* (must be less than 90°). **or** use Pythagoras to find an expression for *BD*.
	$\cos' ABD' = \left(\frac{'22.695...'^2 + 19^2 - 28^2}{2\times '22.695...'\times 19}\right)$ leading to '*ABD*' = **or** $(BAD =)\ \cos^{-1}\left(\frac{28^2 + 19^2 - '22.695...'^2}{2\times 28\times 19}\right)$ (= 53.7…) **and** $\sin' ABD' = \frac{\sin' 53.7'}{'22.695...'}\times 28$ leading to '*ABD*' =				M1 for a complete method to find angle *ABD*
			83.9		A1 accept 83.85 – 83.9
					Total 5 marks