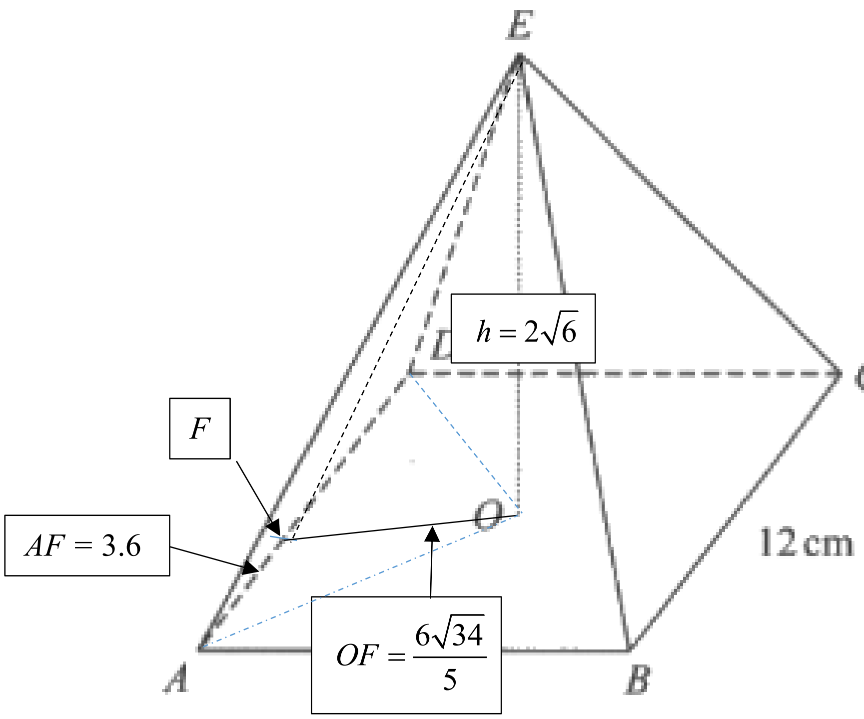
Question number	Scheme	Marks
5 a	$OC = \frac{1}{2}\sqrt{12^2 + 12^2} = \left[6\sqrt{2}\right]$ or $AC = \sqrt{12^2 + 12^2} = \left[12\sqrt{2}\right]$	M1
	$h = EO = 6\sqrt{2} \times \frac{\sqrt{3}}{3} = 2\sqrt{6}$ oe	M1 A1
		(3)
b	Midpoint of AD to $F = \left(6 - \frac{12}{1+4}\right)$ [= 3.6]	M1
	$OF = \sqrt{6^2 + 3.6^2} = \frac{6\sqrt{34}}{5}$	M1
	$\tan\theta = \frac{2\sqrt{6}}{\frac{6\sqrt{34}}{5}} = 35^\circ$	M1 A1
		(4)
		Total 7 marks

USEFUL SKETCH



Part	Mark	Notes
(a)	M1	For using a correct Pythagoras theorem to find either OC, OA $\left(6\sqrt{2}\right)$ or AC $\left(12\sqrt{2}\right)$
	M1	For using the correct trigonometry (tan ratio): $h = '6\sqrt{2}'\tan 30^\circ = \left[2\sqrt{6}\right]$ or equivalent. Eg $\tan 30 = \dfrac{h}{6\sqrt{2}} \Rightarrow h = ...$
	A1	For $2\sqrt{6}$ oe
(b)	M1	For correct expression for the midpoint of AD to F $\left(6 - \dfrac{12}{1+4}\right)$ or 3.6 oe seen
	M1	For the correct use of Pythagoras' to find OF $\dfrac{6\sqrt{34}}{5}$ oe [6.997..] ft their 3.6
	ALT	
	M1	Finds the length OF using cosine rule. $OF = \sqrt{2.4^2 + \left(6\sqrt{2}\right)^2 - 2\times 2.4\times 6\sqrt{2}\times\cos 45} = \left[\dfrac{6\sqrt{34}}{5}\right]$ OR $OF = \sqrt{9.6^2 + \left(6\sqrt{2}\right)^2 - 2\times 9.6\times 6\sqrt{2}\times\cos 45} = \left[\dfrac{6\sqrt{34}}{5}\right]$ OR $\cos 45^\circ = \dfrac{9.6^2 + \left(6\sqrt{2}\right)^2 - OF^2}{2\times 9.6\times 6\sqrt{2}} \Rightarrow OF = ...$ oe [6.997..]
	M1	For the correct evaluation of their cosine rule. $\left(\dfrac{6\sqrt{34}}{5}\text{ oe}\right)$ Accept awrt 7.00 [6.997142…]
	dM1	For the correct use of $\tan\theta = \dfrac{'EO'}{'OF'}$ This mark is dependent on both previous M marks. They must have a valid method to find OF for the award of this mark.
	A1	For 35(°) or better (Calculator value is 34.997…°.)
	Note: There are other methods – if unsure, send to Review.	