

Question number	Scheme	Marks
6 (a)	$\left[ V = \frac{1}{3} \pi r^2 h \right]$ $\tan 30^\circ = \frac{r}{h} \Rightarrow r = \frac{h}{\sqrt{3}}$ $V = \frac{1}{3} \pi \left( \frac{h}{\sqrt{3}} \right)^2 h \Rightarrow V = \frac{1}{9} \pi h^3 *$	<p>M1</p> <p>A1 cso [2]</p>
(b)	$\frac{dV}{dh} = \frac{\pi h^2}{3}$ $\frac{dh}{dt} = \frac{dh}{dV} \times \frac{dV}{dt} \Rightarrow \frac{dh}{dt} = \frac{3}{\pi h^2} \times -0.9 = \frac{3}{\pi \times 1.2^2} \times -0.9 = -0.59683...$ $\approx -0.597 \text{ cm/s}$ <p>[Accept an answer of <math>\pm 0.597 \text{ cm/s}</math>]</p>	<p>M1</p> <p>M1M1 A1 [4]</p>
<b>Total 6 marks</b>		
(a)	<p>Finding <math>r = \frac{h}{\sqrt{3}}</math> and substituting into <math>V = \frac{1}{3} \pi r^2 h</math> (Allow <math>r = h \tan 30^\circ</math>)</p> <p>Obtains the <b>given</b> answer with no errors in the working</p>	
M1		
A1 cso		
(b)		
M1		
M1		
M1		
A1		