Question Number	Answer	Marks
2	$V = \frac{1}{3}\pi r^2 h = \frac{1}{12}\pi h^3$	B1
	$\frac{dV}{dh} = \frac{1}{4}\pi h^2$	M1
	$\frac{dh}{dt} = \frac{dh}{dV} \times \frac{dV}{dt} = \frac{4}{\pi h^2} \times 12$	M1A1ft
	$= \frac{4}{16\pi} = \frac{3}{\pi}$ cm/s	A1
	(Or work with r instead of h at start)	[5]

Notes

B1 for obtaining a correct unsimplified expression for V in terms of a single variable.

$V = \frac{1}{12}\pi h^3$ or $V = \frac{2}{3}\pi r^3$

M1 for attempting the differentiation of V wrt their chosen variable (h or r)

M1 for a correct relevant chain rule expression or expressions which can lead to $\frac{dh}{dt}$ ie

$\frac{dh}{dt} = \frac{dh}{dV} \times \frac{dV}{dt}$ or $\frac{dr}{dt} = \frac{dr}{dV} \times \frac{dV}{dt}$ used with $\frac{dh}{dt} = 2\frac{dr}{dt}$

Allow a chain rule written $\frac{dt}{dh}$

A1ft for substituting *their* $\frac{dh}{dV}$ or $\frac{dr}{dV}$ (algebraic sufficient for this mark) **and** $\frac{dV}{dt} = 12$.

Must be $\frac{dh}{dt}$ now.

A1cao using $h = 4$ or $r = 2$ to obtain $\frac{dh}{dt} = \frac{3}{\pi}$ (cm/s) (Accept any equivalent **exact** fraction). Ignore decimals following a correct exact answer.