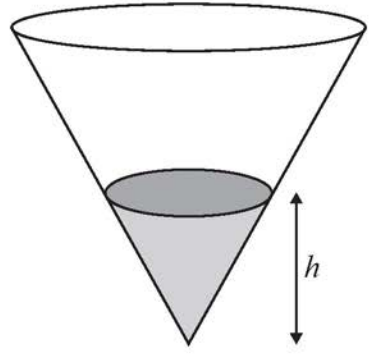
8 Water is poured into an empty cone at a constant rate of $8\,\text{cm}^3/\text{s}$

After t seconds the depth of the water in the inverted cone is h cm, as shown in the diagram below.



When the depth of the water in the inverted cone is h cm, the volume, $V\,\text{cm}^3$, is given by

$$V = \frac{\pi h^3}{12}$$

8 (a) Show that when $t = 3$

$$\frac{\mathrm{d}V}{\mathrm{d}h} = 6\sqrt[3]{6\pi}$$

[4 marks]

8 (b) Hence, find the rate at which the depth is increasing when $t = 3$

Give your answer to three significant figures.

[3 marks]