

5. (10 points) Madam Whippy's ice-cream store has a vending machine that pumps out manilla vanilla at a constant rate of  $2 \text{ cm}^3$  per second. If you are collecting the ice-cream in a cone of maximum radius 5 cm and height 10 cm, how fast is the radius of the surface of the ice-cream changing when the height of ice cream in the cone is 6 cm? Assume that the ice cream is soft-serve and fills the cone with a flat surface.

[You may need: Volume of a cone of height  $h$  and radius  $r$  is given as  $V = \frac{1}{3}\pi r^2 h$ .]