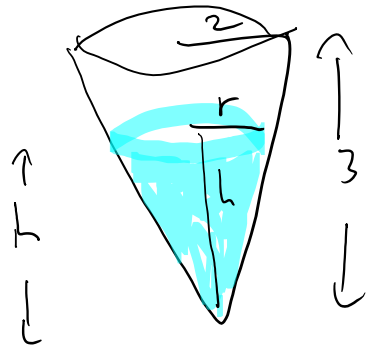
5 $\frac{d}{dt}\left(V = \frac{4}{3}\pi r^3\right)$ $\quad r = 6$

$$\frac{dV}{dt} = 4\pi r^2 \frac{dr}{dt} \qquad \frac{dr}{dt} = 14$$

$$= 4\pi(6)^2 \cdot 14$$

(10)



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

$2\ m^3/min$

$\frac{dh}{dt} = ?$ $\quad h = 2$

$\frac{h}{r} = \frac{3}{2}$

$V = \frac{\pi}{3}\left(\frac{2h}{3}\right)^2 h$

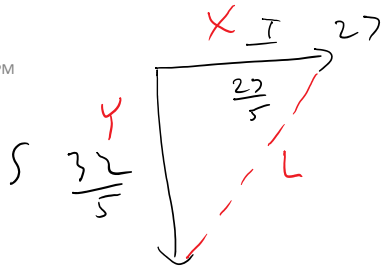
$r = \frac{2h}{3}$

$\frac{d}{dt}\left(V = \frac{4\pi}{27}h^3\right)$

$\frac{dV}{dt} = \frac{12\pi}{27}h^2\frac{dh}{dt}$

$2 = \frac{12\pi}{27}\cdot 2^2 \cdot \frac{dh}{dt}$

$\frac{dh}{dt} = \frac{54}{48\pi}\ \frac{m}{min}$



$\frac{d}{dt}(x^2 + y^2 = L^2)$

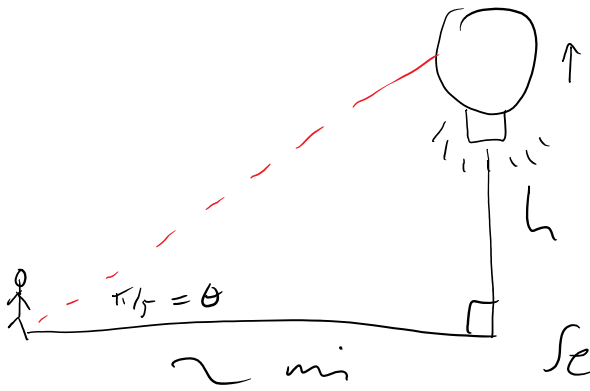
$xx' + yy' = LL'$

$L^2 = 6.4^2 + 5.4^2$

$L = \sqrt{70.12} = 8.37$

$5.4(27) + 6.4(32) = 8.37L'$

(17)



0.2 rad/min

$\frac{d}{dt}\left(\tan\theta = \frac{h}{2}\right)$

$\sec^2\theta \frac{d\theta}{dt} = \frac{1}{2}\frac{dh}{dt}$

$\sec^2\frac{\pi}{5}(0.2)(2) = \frac{dh}{dt} = 0.611$ mi/min

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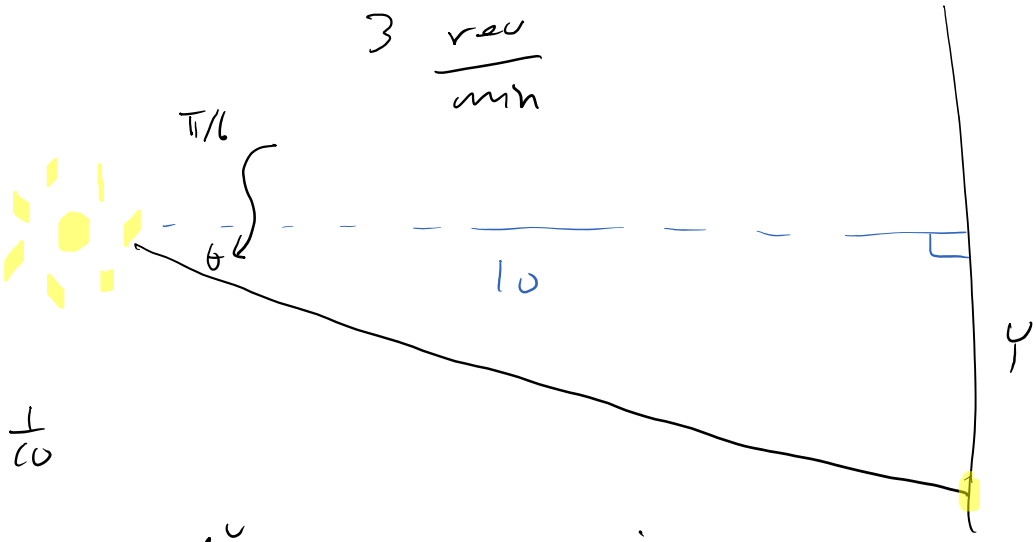
(27)



$$\frac{d}{dt}\left(\tan\theta = \frac{y}{10}\right)$$

$$\sec^2\theta \frac{d\theta}{dt} = \frac{dy}{dt} \cdot \frac{1}{10}$$

$$\frac{4}{3}(6\pi) \cdot 10 = \frac{dy}{dt} = 80\pi \ \frac{mi}{min}$$