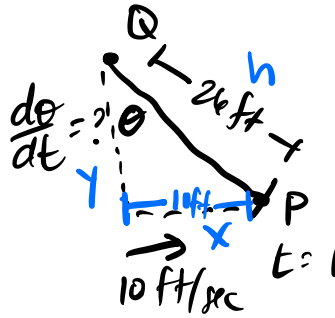
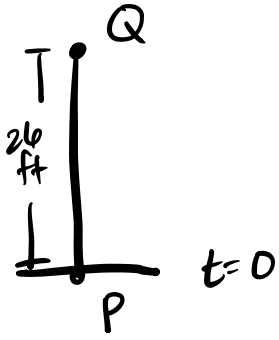


Homework 14

(4)



$$\sin \theta = \frac{x}{h}$$

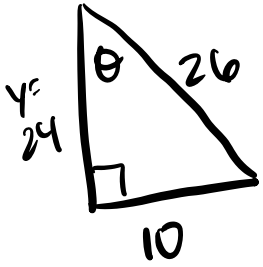
$$\sin \theta = \frac{x}{26}$$

$$x = 26 \sin \theta$$

$$\frac{dx}{dt} = 26 \cos \theta \frac{d\theta}{dt}$$

$$10 = 26 \left(\frac{24}{26} \right) \frac{d\theta}{dt}$$

$$\frac{d\theta}{dt} = \frac{10}{24} = \frac{5}{12} \text{ rad/sec}$$

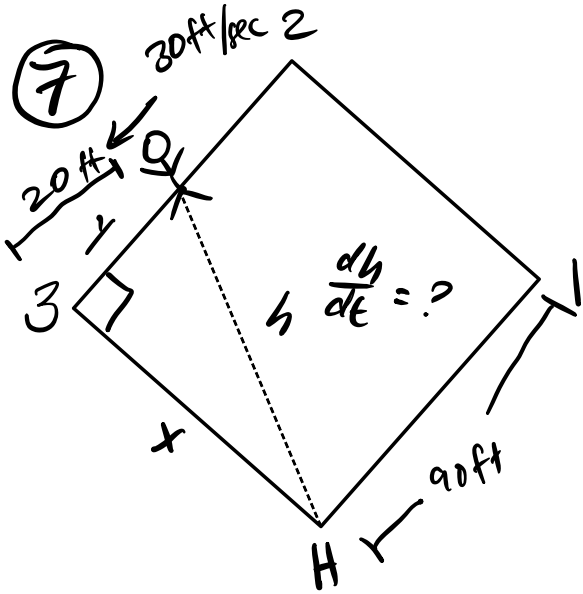


$$26^2 - 10^2 = y^2$$

$$y = 24$$

$$\cos \theta = \frac{24}{26}$$

(7)



$$x^2 + y^2 = h^2$$

$$90^2 + y^2 = h^2$$

$$24 \frac{dy}{dt} = 2h \frac{dh}{dt}$$

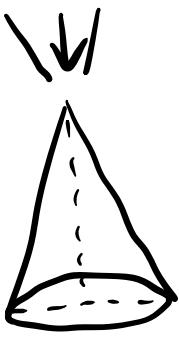
$$2 \cdot 20 \cdot (-30) = 2 \sqrt{8500} \frac{dh}{dt}$$

$$\frac{dh}{dt} = \frac{-6000}{\sqrt{8500}} \text{ ft/sec}$$

$$90^2 + 20^2 = h^2$$

$$h = \sqrt{8500}$$

8



$$h = d$$

$$\frac{dh}{dt} = 5 \text{ ft/min}$$

$$h = 10 \text{ ft}$$

$$\frac{dV}{dt} = ?$$

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

$$r = \frac{1}{2} d$$

$$r = \frac{1}{2} h$$

$$V = \frac{1}{3} \pi \left(\frac{1}{2} h\right)^2 h$$

$$V = \frac{1}{3} \pi \cdot \frac{1}{4} h^2 h$$

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

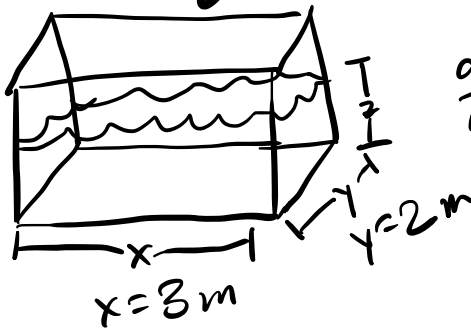
$$\frac{dV}{dt} = \frac{\pi}{4} h^2 \frac{dh}{dt}$$

$$\frac{dV}{dt} = \frac{\pi}{4} (10)^2 \cdot 5$$

$$\frac{dV}{dt} = 125\pi \text{ ft}^3/\text{min}$$

$$\frac{dV}{dt} = 0.3 \text{ m}^3/\text{min}$$

6



$$\frac{dz}{dt} = ?$$

$$V = xyz$$

$$V = 3 \cdot 2 \cdot z$$

$$V = 6z$$

$$\frac{dV}{dt} = 6 \frac{dz}{dt}$$

$$0.3 = 6 \frac{dz}{dt}$$

$$\frac{dz}{dt} = 0.05 \text{ m/sec}$$