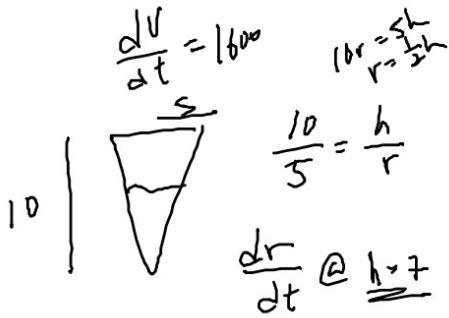


544.)



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

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

$$\frac{\pi}{3} \left(\frac{h^2}{4}\right) \cdot h$$

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

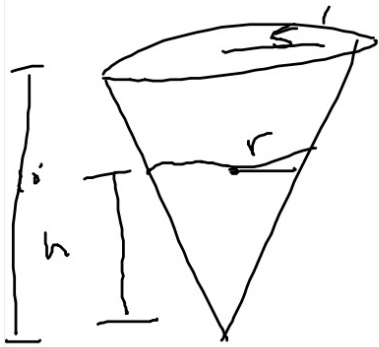
$$h = 2r$$
$$\frac{dh}{dt} = 2 \frac{dr}{dt}$$

$$\frac{dV}{dt} = 1600 = \frac{\pi}{12} 3h^2 \frac{dh}{dt}$$

$$1600 = \frac{\pi}{4} \cdot 49 \frac{dh}{dt}$$

$$\frac{24000}{49\pi}$$

$$\frac{4800}{49\pi} \text{ ft/min}$$



$$\frac{10}{5} = \frac{h}{r}$$

$$\underline{h = 2r}$$

$$\frac{dr}{dt} = ? \quad @ h=7 \quad \frac{dV}{dt} = 1600$$

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

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

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

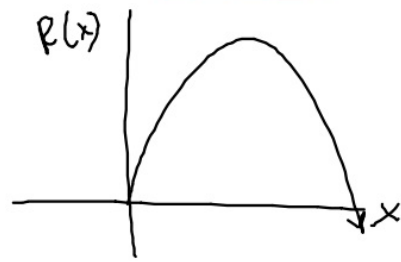
$$\frac{dV}{dt} = \frac{2\pi}{3} \cdot 3r^2 \cdot \frac{dr}{dt}$$

$$\frac{1600}{2\pi(3.5)^2} = 2 \cdot \pi (3.5)^2 \frac{dr}{dt}$$

$$h=7 \rightarrow r=3.5$$

$$\frac{545}{C(x)} = 300 + 4x \quad \left\{ \begin{array}{l} R(x) = \underline{700x} - \frac{1}{5000}x^2 \end{array} \right.$$

x = gals of pesticide product each week.



$$+ 50 \text{ gal/wk} = \frac{dx}{dt}$$

$$300 \text{ gal/wk} = x$$

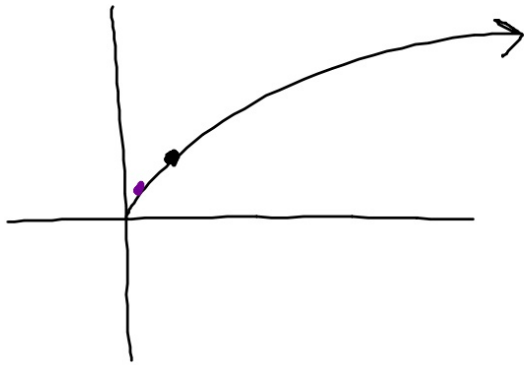
$$a) \frac{dR}{dt} = 700 \cdot \frac{dx}{dt} - \frac{1}{2500}x \frac{dx}{dt} = \boxed{\$34,994} / \text{wk}$$

$\begin{matrix} \uparrow & & \uparrow & \uparrow \\ 50 & & 300 & 50 \end{matrix}$

$$b) C \frac{dC}{dt} \Rightarrow 4 \frac{dx}{dt} = \$200$$

$$c) \frac{d}{dt} P = \frac{d}{dt} (R - C)$$

$$\frac{dP}{dt} = \frac{dR}{dt} - \frac{dC}{dt} = \underline{\underline{\$34,794}} \text{ \$ / wk}$$



$$\frac{d}{dt} y = \frac{d}{dt} (x^{1/2})$$

$$\frac{dy}{dt} = \frac{1}{2} x^{-1/2} \cdot \frac{dx}{dt}$$

$$1 \cdot y\text{-rate} = \frac{1}{2x^{1/2}} \cdot x\text{-rate}$$

$$1 = \frac{1}{2x^{1/2}}$$

$$2\sqrt{x} = 1$$

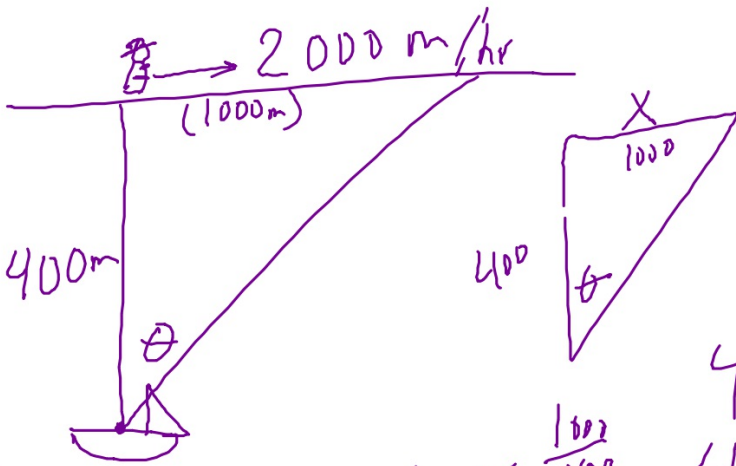
$$\sqrt{x} = \frac{1}{2}$$

$$\underline{x = \frac{1}{4}}, y = \frac{1}{2}$$

$$y = \sqrt{x}$$

$(\frac{1}{4}, \frac{1}{2})$

537-539, 541, 543, 547
(ladder) (dre. Mon.)



$$\frac{d\theta}{dt} = ?$$

$$\tan \theta = \frac{1000}{400}$$

$$\tan^{-1}\left(\frac{1000}{400}\right) = \theta$$

$$\theta = \text{---}$$

$$\tan \theta = \frac{X}{400}$$

$$400 \tan \theta = X$$

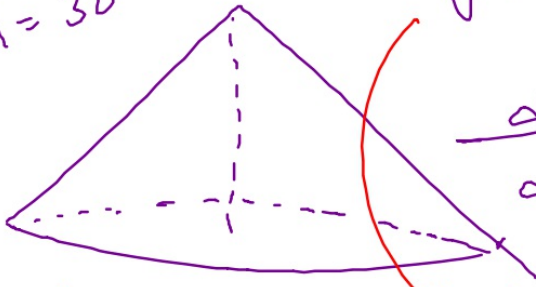
$$400 \sec^2 \theta \cdot \frac{d\theta}{dt} = \frac{dX}{dt}$$

↓
?

$.61 \text{ deg/min}$

$$D = 4 \cdot h$$

$$h = 30$$



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

$$\frac{dV}{dt} = 20$$

$$\frac{dD}{dt} = ? \quad | \quad h = 30$$

$$\frac{D}{4} = h$$

$$\frac{dV}{dt} = \frac{\pi}{3}$$

$$h = \frac{D}{4} \rightarrow V = \frac{\pi}{3} \cdot r^2 \cdot \frac{D}{4}$$

$$D = 2 \cdot r$$

$$\frac{D}{2} = r$$

$$\frac{D^2}{4} = r^2$$

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

$$V = \frac{\pi}{48} \cdot D^3$$

$$\frac{dV}{dt} = \frac{\pi}{48} \cdot 3D^2 \cdot \frac{dD}{dt}$$

$$20 = \frac{\pi}{48} \cdot 3(120^2) \cdot D'$$

$$\frac{D = 4 \cdot h}{D = 120}$$

$$V_{\text{cone}} = \frac{\pi}{3} r^2 h$$

$$\frac{dA}{dt} = 18$$

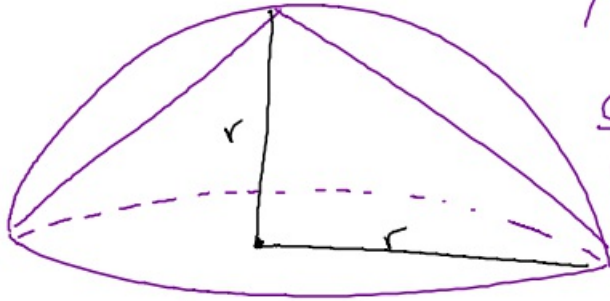
$$A_{\text{sphere}} = 4\pi r^2$$

$$A = 3\pi r^2$$

$$\frac{dA}{dt} = 6\pi r \cdot \frac{dr}{dt}$$

$$18 = 6\pi r \cdot \frac{dr}{dt}$$

$$\frac{3}{\pi r} = \frac{dr}{dt}$$



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

$$r=4$$

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

$$V = \frac{\pi}{3} r^3$$

$$\frac{dV}{dt} = \frac{\pi}{3} \cdot 3r^2 \cdot \frac{dr}{dt}$$

$$\frac{dV}{dt} = \pi r^2 \cdot \frac{3}{\pi r}$$

$$= 3r$$

$$= 12$$