

Assignment 4.6 Even Answers

$$2) \frac{dS}{dt} = 8\pi r \frac{dr}{dt}$$

$$4) a) \frac{dP}{dt} = 2RI \frac{dI}{dt} + I^2 \frac{dR}{dt}$$

$$b) \frac{dP}{dt} = 0 \Rightarrow -\frac{2P}{I^3} = \frac{dI}{dt}$$

$$6) \frac{dA}{dt} = \frac{1}{2} \left(b \sin \theta \frac{da}{dt} + a \sin \theta \frac{db}{dt} + ab \cos \theta \frac{d\theta}{dt} \right)$$

$$10) a) \frac{dV}{dt} = 2 \text{ m}^3/\text{sec}$$

$$b) \frac{dS}{dt} = 0 \text{ m}^2/\text{sec}$$

$$c) \frac{ds}{dt} = 0 \text{ m}/\text{sec}$$

$$12) \frac{dh}{dt} = \frac{1}{16} \text{ ft}/\text{min}$$

$$16) a) \frac{dh}{dt} = \frac{1125}{32\pi} \text{ cm}/\text{min}$$

$$b) \frac{dr}{dt} = \frac{375}{8\pi} \text{ cm}/\text{min}$$

$$18) a) \frac{dy}{dt} = -\frac{25}{6\pi} \text{ cm}/\text{min}$$

$$b) r = \sqrt{169 - (13 - y)^2}$$

$$c) \frac{dr}{dt} = -\frac{125}{72\pi} \text{ cm}/\text{min}$$

$$20) a) \frac{dr}{dt} = 1 \text{ ft}/\text{min}$$

$$b) \frac{dS}{dt} = 40\pi \text{ ft}^2/\text{min}$$

$$22) \frac{ds}{dt} = 11 \text{ ft}/\text{sec}$$

$$24) a) \frac{dy}{dt} = \frac{10}{9\pi} \text{ in}/\text{min}$$

$$b) \frac{dh}{dt} = \frac{8}{5\pi} \text{ in}/\text{min}$$

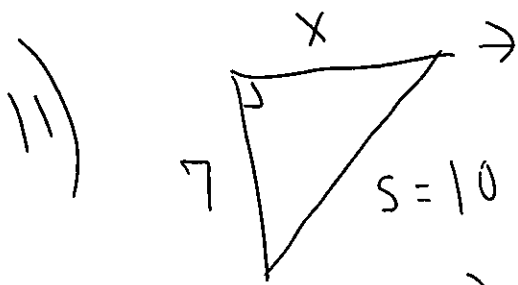
$$28) \frac{dD}{dt} = -5 \text{ m}/\text{sec}$$

$$30) \frac{dx}{dt} = -1500 \text{ ft}/\text{sec}$$

See the following pages

for selected solutions

done in class 12/3/09



$$\frac{d}{dt} (49 + x^2 = s^2)$$

$$2x \frac{dx}{dt} = 2s \frac{ds}{dt}$$

$$\sqrt{51} \frac{dx}{dt} = 10(300) \rightarrow$$

$$300 \text{ mi/hr} = \frac{ds}{dt}$$

$$\frac{dx}{dt} = \dots$$

$$\frac{dx}{dt} = \frac{3000}{\sqrt{51}} \text{ mi/hr}$$

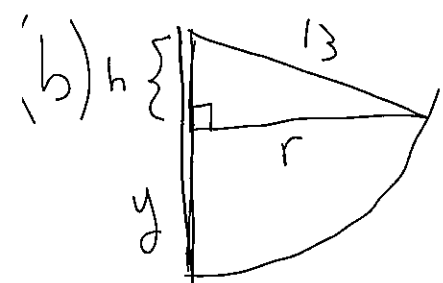
#18

$$V = \frac{\pi}{3} (39 - y) y^2 = \frac{\pi}{3} (39y^2 - y^3) \quad \frac{dV}{dt} = 6 \text{ m}^3$$

a) $\frac{dy}{dt} = ? \quad y = 8$

$$\frac{dV}{dt} = \frac{\pi}{3} \left(78y \frac{dy}{dt} - 3y^2 \frac{dy}{dt} \right)$$

$$6 = \frac{\pi}{3} \left(78(8) \frac{dy}{dt} - 3(64) \frac{dy}{dt} \right)$$



$$h(13 - y)$$

$$13^2 - (13 - y)^2 = r^2$$

$$r = \sqrt{169 - (13 - y)^2}$$

c)

$$\frac{dr}{dt} = \frac{1}{2\sqrt{169 - (13 - y)^2}} \cdot \left(2(13 - y) \frac{dy}{dt} \right)$$

$$\frac{dr}{dt} = \frac{2(13 - 8) \frac{dy}{dt}}{2\sqrt{169 - (13 - 8)^2}} \leftarrow \text{part (a)}$$