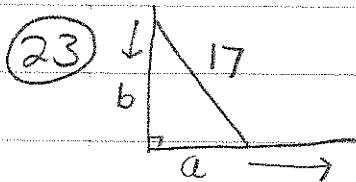


Part 2 of w.s. 1

⑨ $\frac{dx}{dt} = 12$ $x = 80$

$\frac{dc}{dt} = .4x \frac{dx}{dt} = .4(80)(12) = 384$



$a^2 + b^2 = 17^2$

$\frac{da}{dt} = 9$

$\frac{db}{dt} = ?$ $a = 8$
 $b = 15$

$2a \frac{da}{dt} + 2b \frac{db}{dt} = 0$

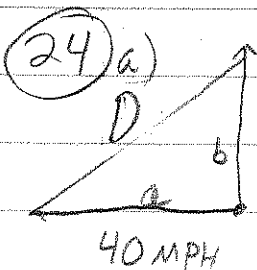
$8^2 + b^2 = 17^2$

$b = 15$

$2(8)(9) + 2(15) \frac{db}{dt} = 0$

$-144 = 30 \frac{db}{dt}$

$-4.8 \frac{ft}{min} = \frac{db}{dt}$



$a^2 + b^2 = D^2$

$\frac{da}{dt} = 40$

$\frac{db}{dt} = 30$

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

2 hours \Rightarrow $a = 80$ $b = 60$ $D = 100$

$2a \frac{da}{dt} + 2b \frac{db}{dt} = 2D \frac{dD}{dt}$

$2(80)(40) + 2(60)(30) = 2(100) \frac{dD}{dt}$

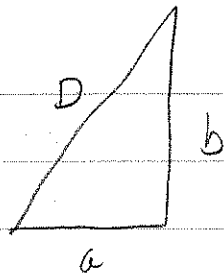
$6400 + 3600 = 200 \frac{dD}{dt}$

$10000 = 200 \frac{dD}{dt}$

part h

$50 = \frac{dD}{dt}$

#24
part b



$$a=40$$

$$b=60$$

$$D = \sqrt{5000}$$

$$\frac{da}{dt} = 40$$

$$\frac{db}{dt} = 30$$

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

$$a^2 + b^2 = D^2$$

$$2a \frac{da}{dt} + 2b \frac{db}{dt} = 2D \frac{dD}{dt}$$

$$80(40) + 120(30) = 2\sqrt{5000} \frac{dD}{dt}$$
$$3200 + 3600 = 144.22 \frac{dD}{dt}$$

$$47.15 = \frac{dD}{dt}$$

(25) $\frac{dr}{dt} = \frac{2 \text{ ft}}{\text{min}}$ $\frac{dA}{dt} = ?$ $r=4$



$$A = \pi r^2$$

$$\frac{dA}{dt} = 2\pi r \frac{dr}{dt}$$

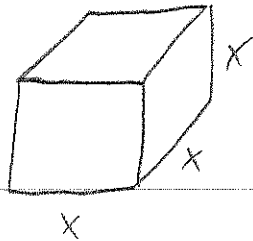
$$\frac{dA}{dt} = 2\pi(4)(2) = 16\pi \approx 50.27 \frac{\text{ft}^2}{\text{sec}}$$

(26) $V = \frac{4}{3}\pi r^3$ $\frac{dr}{dt} = -\frac{1}{4} \frac{\text{in}}{\text{hr}}$ $\frac{dV}{dt} = ?$ $r=4$

$$\frac{dV}{dt} = \frac{4}{3}\pi 3r^2 \frac{dr}{dt}$$

$$= 4\pi(16)\left(-\frac{1}{4}\right) = -16\pi \approx -50.27 \frac{\text{in}^3}{\text{hr}}$$

(27)



$$\frac{dV}{dt} = -2 \frac{\text{cm}^3}{\text{min}} \quad \frac{dx}{dt} = ? \quad x = 3$$

$$V = x^3$$

$$\frac{dV}{dt} = 3x^2 \frac{dx}{dt}$$

$$-2 = 3(9) \frac{dx}{dt}$$

$$\boxed{\frac{-2}{27} = \frac{dx}{dt}}$$

(28)

$$\frac{dr}{dt} = \frac{3}{4} \frac{\text{in}}{\text{min}}$$

$$h = 2r$$

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

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

$$r = 6$$

$$h = 12$$

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

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

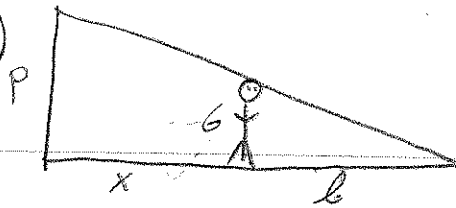
$$V = \frac{2}{3} \pi r^3$$

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

$$= 2\pi (6^2) \frac{3}{4}$$

$$= 54\pi \approx \boxed{169 \frac{\text{in}^3}{\text{min}}}$$

29



$$\frac{6}{P} = \frac{l}{x+l}$$

$$x=8 \quad l=10$$

$$\frac{6}{P} = \frac{10}{18}$$

$$P=10.8$$



$$\frac{dl}{dt} = ? \quad x=25' \quad \frac{dx}{dt} = 50 \frac{ft}{min}$$

$$\frac{10.8}{6} = \frac{x+l}{l}$$

$$\frac{10.8}{6} = \frac{25+l}{l}$$

$$0 = \frac{\left(\frac{dx}{dt} + \frac{dl}{dt}\right)l - (x+l)\frac{dl}{dt}}{l^2}$$

$$10.8l = 150 + 6l$$

$$4.8l = 150$$

$$l = 31.25$$

$$0 = \frac{\left(50 + \frac{dl}{dt}\right)(31.25) - (25 + 31.25)\frac{dl}{dt}}{31.25^2}$$

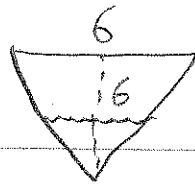
$$31.25^2$$

$$1562.5 + 31.25 \frac{dl}{dt} - 56.25 \frac{dl}{dt} = 0$$

$$1562.5 = 25 \frac{dl}{dt}$$

$$62.5 = \frac{dl}{dt}$$

(30) $\frac{dh}{dt} = ?$ $\frac{dV}{dt} = 4 \text{ ft}^3/\text{min}$



$$V = \left(\frac{1}{3}\right) b h \cdot h_T$$

$$h_T = 16 \quad b_D = h_D$$

$$h_D = 4'$$

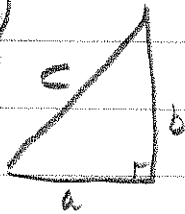
$$V = \frac{1}{3} h^2 (16)$$

$$V = 8h^2$$

$$\frac{dV}{dt} = 16h \frac{dh}{dt} \Rightarrow 4 = 16(4) \frac{dh}{dt}$$

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

(31)



$$a^2 + b^2 = c^2$$

$$2a \frac{da}{dt} + 2b \frac{db}{dt} = 2c \frac{dc}{dt}$$

$$a = 8 \quad \frac{da}{dt} = ?$$

$$b = 8$$

$$\frac{db}{dt} = 0$$

$$c = 8\sqrt{2}$$

$$\frac{dc}{dt} = -1$$

$$16 \left(\frac{da}{dt}\right) + 0 = 16\sqrt{2}(-1)$$

$$\frac{da}{dt} = -\sqrt{2} \frac{\text{ft}}{\text{sec}}$$