Section 4.6 p. 254: 36-41

Saturday, December 5, 2015
10:52 PM

(36) True $C = 2\pi r$

$$\frac{dC}{dt} = 2\pi \frac{dr}{dt}$$

So a constant $\frac{dr}{dt}$ results in a constant $\frac{dC}{dt}$.

(37) False. $A = \pi r^2$

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

So $\frac{dA}{dt}$ depends on r.

(38) $\frac{dV}{dt} = 24 \text{ in}^3/\text{min}$ $\frac{de}{dt} = 2 \text{ in/min}$

$$V = e^3$$

$$\frac{dV}{dt} = 3e^2 \frac{de}{dt}$$

$$24 = 3e^2(2)$$

$e = 2$ in **A**

(39) $\frac{dV}{dt} = 24 \text{ in}^3/\text{min}$ $\frac{dA}{dt} = 12 \text{ in}^2/\text{min}$

$V = e^3$ $A = 6e^2$

$\frac{dV}{dt} = 3e^2 \frac{de}{dt}$ $\frac{dA}{dt} = 12e \frac{de}{dt}$

$24 = 3e^2 \frac{de}{dt}$ $12 = 12e \frac{de}{dt}$

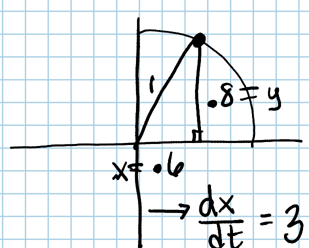
$8 = e^2 \frac{de}{dt}$ $1 = e \frac{de}{dt}$

subst. $\frac{de}{dt} = \frac{1}{e}$

$$8 = e^2\left(\frac{1}{e}\right)$$

$8 = e$ in **E**

(40)



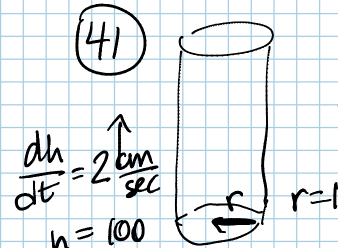
$$x^2 + y^2 = 1$$

$$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 0$$

$$2(.6)(3) + 2(.8)\frac{dy}{dt} = 0$$

$\frac{dy}{dt} = -2.25$ **C**

(41)



$\frac{dV}{dt} = 0$ (Volume doesn't change)

$$V = \pi r^2 h$$

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

$$0 = 2\pi(1)(100)\frac{dr}{dt} + \pi(1)^2(2)$$

$\frac{dr}{dt} = -.01$ **B** (shrinking)