Best cha 4 problem Brayden Bossey
4.2
#28

The rain drop evaporates at ~~[illegible]~~ two ~~[illegible]~~ times the surface volume.

$V = \frac{4}{3}(\pi r^3)$

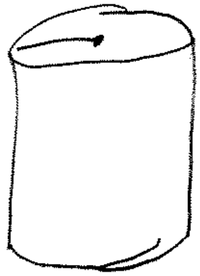
$\frac{dV}{dt} = 4\pi \frac{dr}{dt}$ $\frac{dV}{dt} = -2$

evaporation rate $\frac{dV}{dt} = -8\pi r^2$

This is a good problem b/c it is a easy to see implicit differentiation problem. To begin with we are trying to find the rate of chang for volume. Well it so happens that $\frac{dV}{dt}$ = Surface area. Using a little bit of ~~thought~~ ~~appli~~ thought evaporation is minus and ~~equals~~ $\frac{dr}{dt} = 2$. It helps to understany the theory when you can see it clearly in a problem.

Zac Walton | Favorite problem

4.2 #23 How fast does the level of a coke go down if you drink a cubic inch per second? The cup is a cylinder of radius 2 inches – first write down the volume



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

$$\frac{dV}{dt} = 1 \, in^3/sec$$

$$\frac{V(in^3)}{\pi(4\,in^2)} = h \rightarrow \frac{dV}{dt}(1\,in^3/1\,sec)$$

$$\frac{-1}{\pi 4} = \frac{-0.07958\,in}{sec}$$

is the change in h over the change in time $\frac{dh}{dt}$

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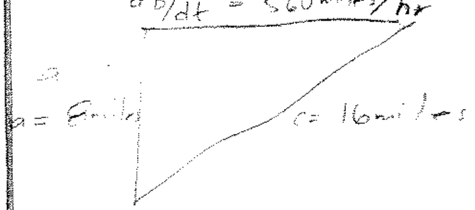
CH 4 Review Problem
CH 4 Sec 4.2 #24

Question

A jet flies at 8 miles up and 560 miles/hr. How fast is it approaching you when
a. It is 16 miles from you
b. Its shadow is 8 miles from you (sun is overhead)
c. The plane is 8 miles from you (exactly above)

$db/dt = 560$ miles/hr

Solution



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

To get c's distance:

$$a^2 + b^2 = c^2$$
$$\sqrt{64 + b^2} = c$$

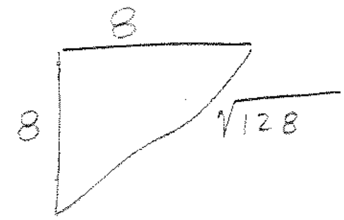
Rate of distance $= \frac{b}{\sqrt{64 + b^2}} \frac{db}{dt} = \frac{dc}{dt}$

C's rate when c = 16 miles

$$b = \sqrt{16^2 - 8^2} \rightarrow \sqrt{256 - 64} = 8\sqrt{3}$$

therefore: $\frac{dc}{dt} = \frac{8\sqrt{3}}{16}(560) =$ **$280\sqrt{3}$ miles/hour**

b.



c's rate when $c = \sqrt{128}$

$\frac{dc}{dt} = \frac{8}{\sqrt{128}}(560) =$ **$280\sqrt{2}$ miles/hour**

c. If c = 0 then rate $\frac{dc}{dt}$ = 0

4 NOV. 09

5.4.10 $\int \sqrt{1-3x}\, dx$

$u = 1-3x$
$du = -3\, dx$
$-\frac{du}{3} = dx$

$\int \sqrt{u}\left(-\frac{du}{3}\right)$

$-\frac{1}{3}\int \sqrt{u}\, du$

$-\frac{1}{3}\int u^{1/2}\, du$

$-\frac{1}{3}\left(\frac{2}{3}u^{3/2}\right) + C$

$-\frac{2}{9}(1-3x)^{3/2} + C$