Applied Problem

2.) In the problem this is what they gave me : a = acceleration, J = a'(t)
← Jerk

a.) Jerk is the derivative of acceleration

b.) $s(t) = -8.25t^2 + 66t$ $\quad a'(t) = J$

$s'(t) = 2(-8.25)t + 66$

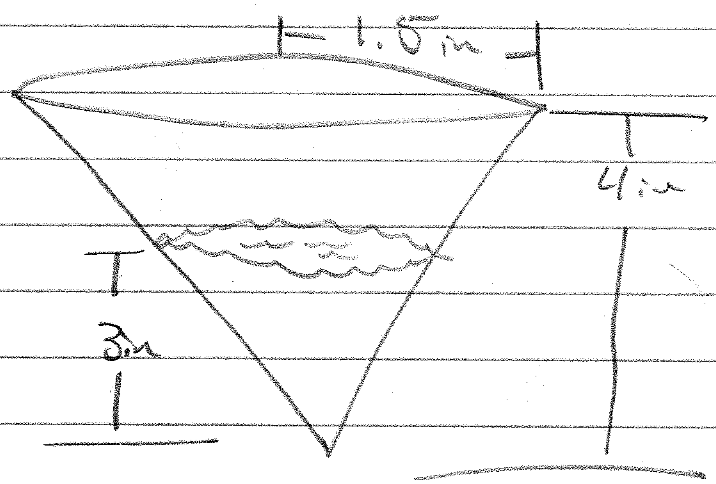
$s''(t) = -16.5$

The double derivative of s(t) is -16.5.

C.) "a" equals Position
"b" equals acceleration
"C" equals Jerk
"d" equals velocity

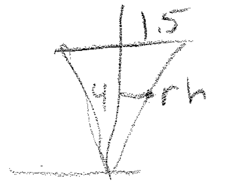
line a is the Position, line b is the acceleration, C is Jerk and d is the velocity.

3.)



$\frac{dv}{dt} = -2 in^3/min$

I was give the diameter of Cone is 3in, the height is 4in and that the new height of water level is 3in. Also I was given rate of change of water Volume is $-2 in^3/min$.



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

$\frac{1.5}{4} = \frac{r}{h}$

$\frac{r}{1.5} = \frac{h}{4}$

$4r = 1.5h$

$r = 3.75(h)$

$r = \frac{\frac{3}{2}}{4} h$

$r = \frac{3}{8} h$

$V = \frac{\pi}{3}\left(\frac{3}{8}h\right)^2 \cdot h$

$V = \frac{\pi}{3} .140625 h^3$

$\frac{dv}{dt} = 3(\pi .046875) h^2 \frac{dh}{dt}$

$\frac{3(9)(0.046875\pi)}{2}$

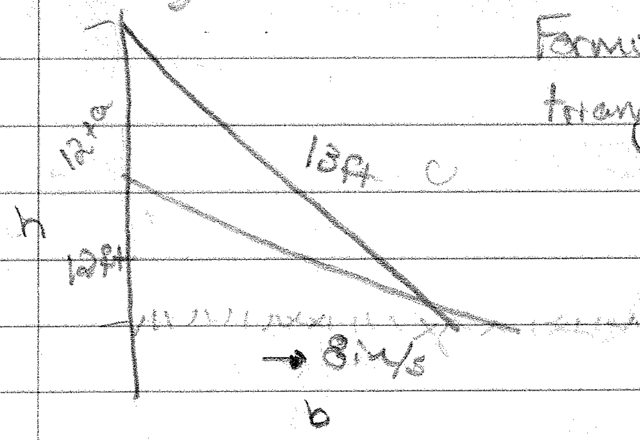
1.265625

$\frac{dh}{dt} = -0.503 \text{ in/min}$

The height of the water in the Cone changes at a rate of -0.503in/min

6.) In Problem 6 I was given: $\frac{db}{dt} = 8$in/s length of ladder is 13 ft.

Formula for Area of triangle $\frac{1}{2}bh$



given $\frac{db}{dt} = 8$ in/sec   sim. $\frac{18ft}{12ft} = \frac{8}{12} = \frac{2}{3}$

have to find $\frac{dA}{dt}$ = when h = 12

$A = \frac{1}{2}bh$

$h = \sqrt{169 - b^2}$

$b = \sqrt{169 - h^2}$

$A = \frac{1}{2}b\left(\sqrt{169 - b^2}\right)$

$b = 5$

$$\frac{dA}{dt} = \frac{1}{2}\left[\left(\frac{1}{2}\frac{1}{\sqrt{169-b^2}}\right)\left(-2b\frac{db}{dt}\right)(b) + \left(\sqrt{169-b^2}\right)\left(\frac{db}{dt}\right)\right]$$

$$\frac{-b^2}{\sqrt{169-b^2}} \cdot \frac{db}{dt} + \sqrt{169-b^2}\,\frac{db}{dt}$$

$$\frac{dA}{dt} = \frac{1}{2}\frac{db}{dt}\left[\frac{-b^2}{\sqrt{169-b^2}} + \sqrt{169-b^2}\right]$$

$$\frac{dA}{dt} = \frac{1}{2}\cdot\frac{2}{3}\left[\frac{-25}{12} + 12\right]$$

$$\frac{dA}{dt} = 3.305 \text{ ft}^2/\text{s}$$