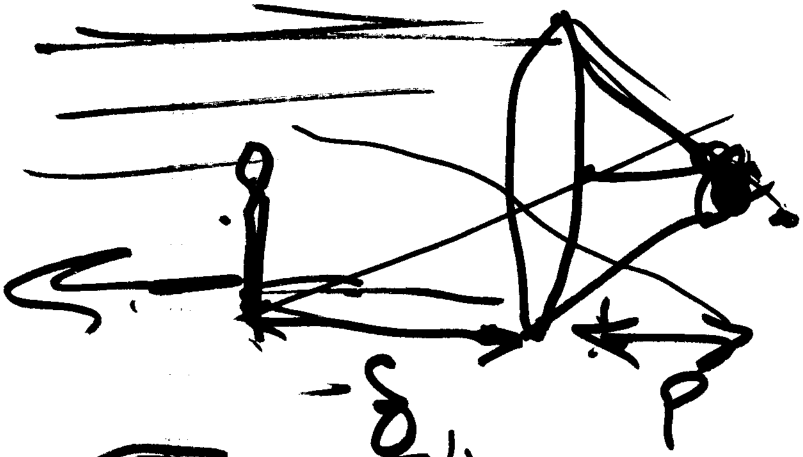
10/4



If $\frac{dp}{ds} = 3$

move object .1

.1 moves image

$\frac{1}{ps} + \frac{1}{5}$

$$\frac{1}{f} = \frac{1}{p} + \frac{1}{s}$$

20 cm

$$\frac{1}{20}$$

$$\frac{1}{40} + \frac{1}{40}$$

$$= \frac{1}{f} = \frac{1}{p} = \frac{1}{20}$$

$s'(p)$ $\quad p = 11 \quad$ $s(p) = \left(\frac{1}{20} - p^{-1}\right)^{-1}$

$\frac{1}{s} = \frac{1}{f} - \frac{1}{p} \quad$ $s' = -1\left(\frac{1}{20} - p^{-1}\right)^{-2} \cdot p^{-2}$

$s'(11) = -4.9 \quad \Delta p = \pm .1 \quad \Delta s \approx -.49$

$$\frac{1}{20} = g^{-1} + p^{-1}$$

$$\left(\frac{1}{F} - p^{-1}\right)^{-1}$$

$$g' \quad \frac{d}{dp}$$

$$\frac{1}{20} = g(p)^{-1} + p^{-1}$$

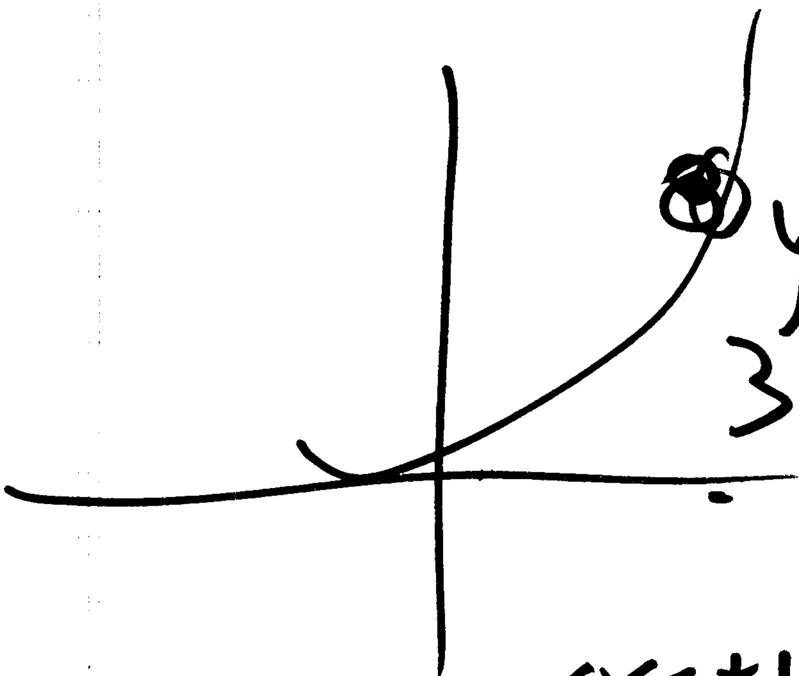
$$0 = -\left(g(p)\right)^{-2} \cdot g'(p)$$ [redacted] $$p^{-2}$$

$$g^{-2} g' = -p^{-2}$$

$$g' = -\frac{p^{-2}}{g^{-2}} = -\frac{g^{2}}{p^{2}}$$

$$g'(11) = -\frac{\left(\frac{1}{20} - \frac{1}{11}\right)^{-2}}{11^{2}}$$

$\Delta x \cdot \frac{dy}{dx} \approx \Delta y$



$y = x^2$

$3, 9$

$m = \frac{dy}{dx} = 6$

$(3.1)^2 \approx$

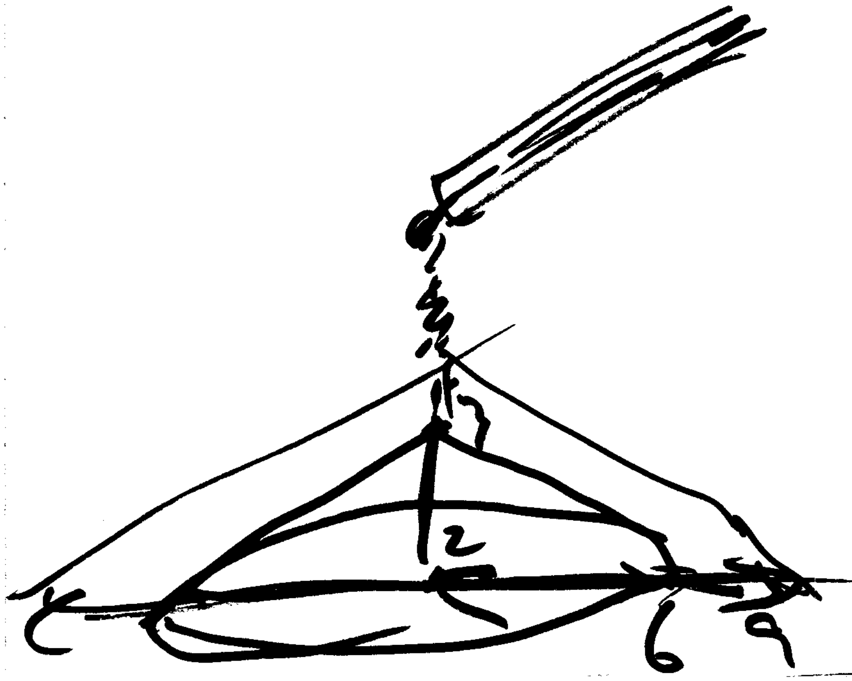
$\Delta x = +.1$

$9 +$

$\Delta y \approx .6$

$(3.1)^2 = 9.61$

$(3 + .1)^2 = 3^2 + 2 \cdot 3 \cdot .1 + .1^2$



$V'(t) = 90$

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

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

$V = \frac{1}{3}\pi \left(\frac{3}{2}h\right)^2 \cdot h$

$2r = 3h$

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

1. relate statically

$\boxed{V = \frac{3}{4}\pi h^3}$

$h'(t)$

$h'(t)$ when $h = 30$

2. Identify time dependence

$V(t) = \frac{3}{4}\pi\, h(t)^3$

$V'(t) = \frac{3}{4}\pi \cdot 3\, h(t)^2 \cdot h'(t)$

$$V(t) = \frac{3}{4}\pi\, h(t)^3$$

$$h(t) = \left(\frac{4\,V(t)}{3\pi}\right)^{\frac{1}{3}}$$

$$h'(t) = \frac{1}{3}\left(V(t) \right)^{-2/3} \cdot \frac{4V'(t)}{3\pi}$$

t when h=30??

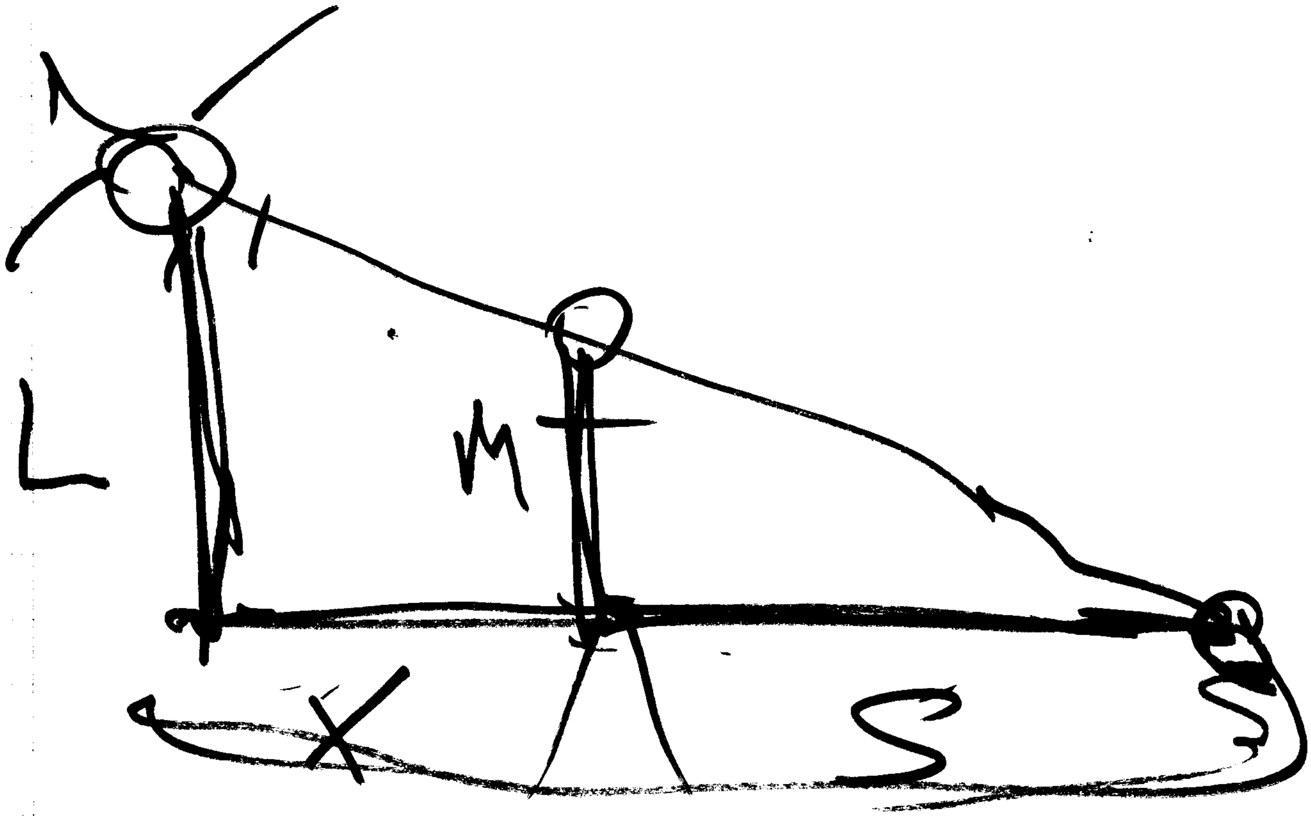
$$V' = \frac{3}{4}\pi \cdot 3\, h^2 \cdot h'$$

$V' = 90$ cc/sec

h' when $h = 11$

$$h' = \frac{4V'}{9\pi \cdot h^2}$$

$$h' = \frac{4 \cdot 90}{9\pi \cdot 11^2}$$



Static $\dfrac{S}{M} = \dfrac{S+X}{L}$

dyn $\dfrac{S(t)}{M} = \dfrac{S(t)+X(t)}{L}$

$$\frac{S'}{M} = \frac{S'+X'}{L}$$

Solve for S' and find $S'+\underline{X'}$