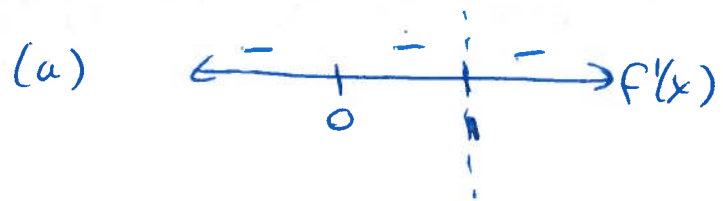


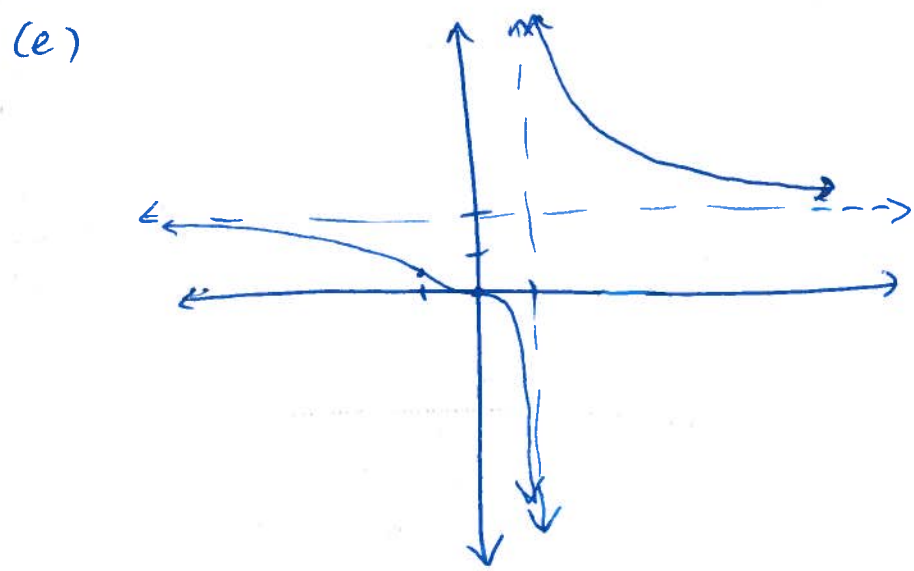
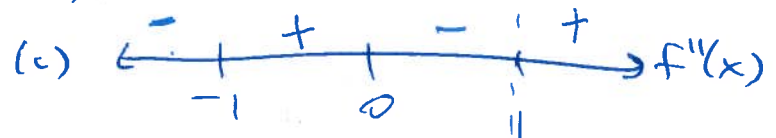
1) $f(x) = \frac{2x^3}{(x-1)^3}$, $f'(x) = \frac{-6x^2}{(x-1)^4}$, $f''(x) = \frac{12x+12x^2}{(x-1)^5}$



(b) VA at $x=1$
HA at $y=2$

(c) no min/max pts

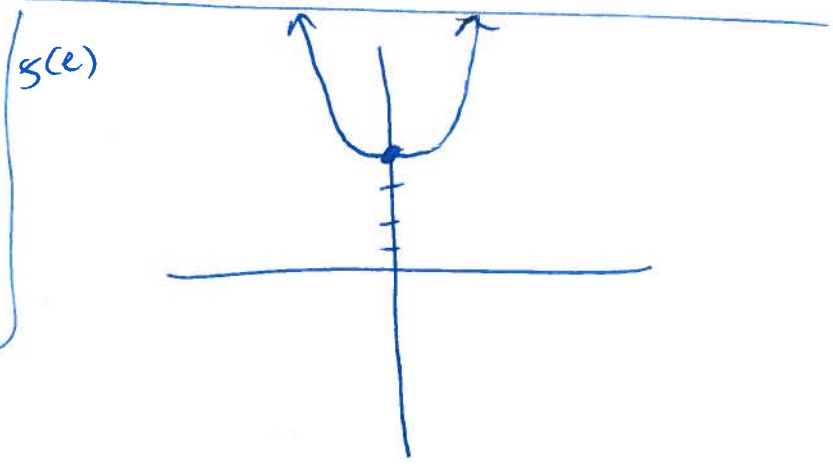
(d) $(-1, \frac{1}{4})$ $(0, 0)$



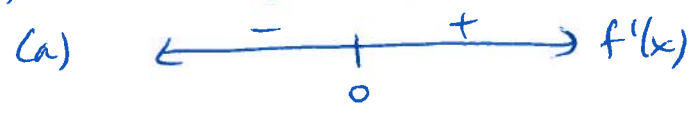
2) $r = 4$ ft, $h = 4$ ft

3) $\frac{dV}{dt} = -\frac{72\pi}{5}$ cm^3/min

4) $\frac{3}{8}$ ft/sec



5) (b) no asymptotes



(b) min pt at $(0, 4)$; no max



(d) no inflection pts

(6) (b) VA: $x = -4$, HA: $y = 2$

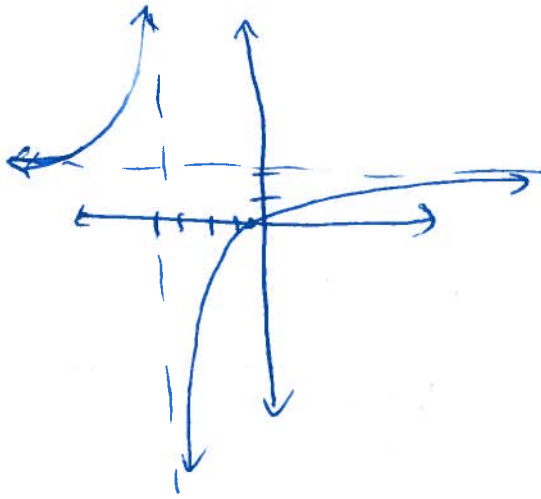
(a) $f'(x)$ sign chart: $x < -4$ is +, $x > -4$ is +.

(b) no min/max pts

(c) $f''(x)$ sign chart: $x < -4$ is +, $x > -4$ is -.

(d) no inflection pts

(e)



(7) 5 and 5

(8) 4 and -4

(a) (b) no asymptotes

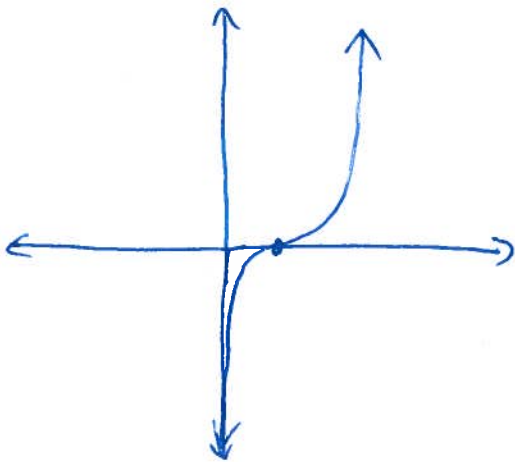
(a) $f'(x)$ sign chart: $x < 1$ is +, $x > 1$ is +.

(b) no min/max pts

(c) $f''(x)$ sign chart: $x < 1$ is -, $x > 1$ is +.

(d) $(1, 0)$

(e)



(12) $dy = 0.15 \approx by$

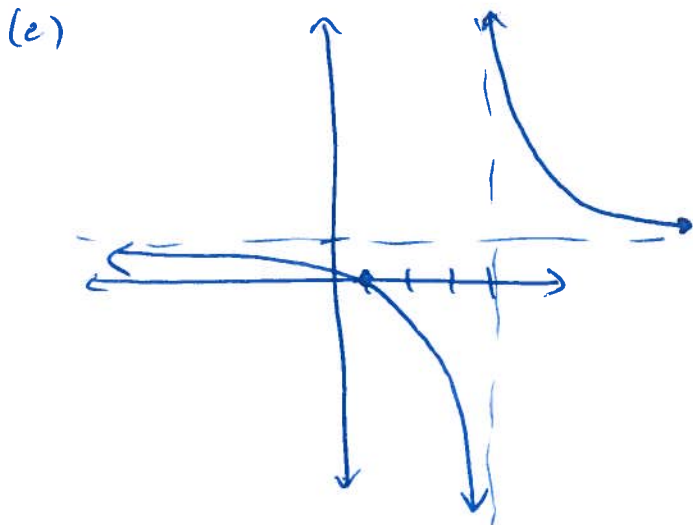
(10) $r = 5\sqrt{6}$ m, $h = 5\sqrt{3}$ m

(11) each pen is $\frac{5\sqrt{30}}{2}$ ft by $\frac{8\sqrt{30}}{3}$ ft

(13) (a) VA: $x=4$, HA: $y=1$

(a) $f'(x)$ (b) no min/max pts

(c) $f''(x)$ (d) no inflection pts



(14) $\frac{1}{12\pi}$ ft/sec

(15) (a) no asymptotes

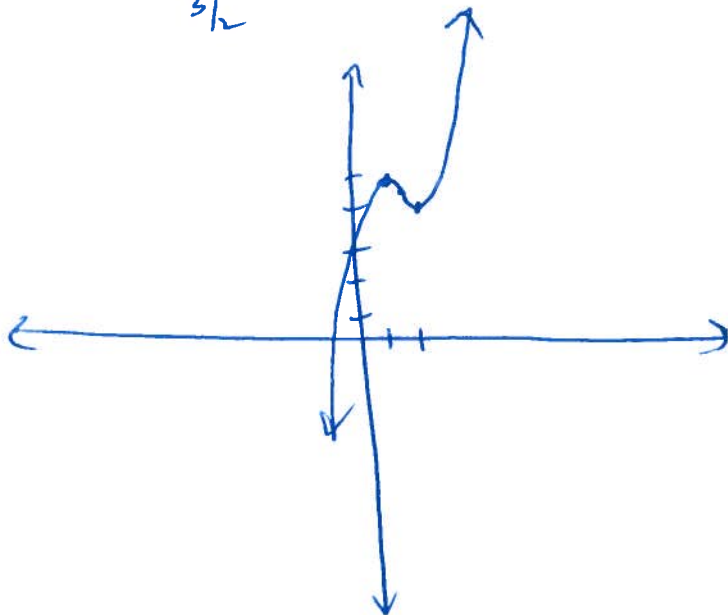
(a) $f'(x)$

(b) max: $(1, 5)$
min: $(2, 4)$

(c) $f''(x)$

(d) inf. pt $(\frac{3}{2}, \frac{9}{2})$

(e)



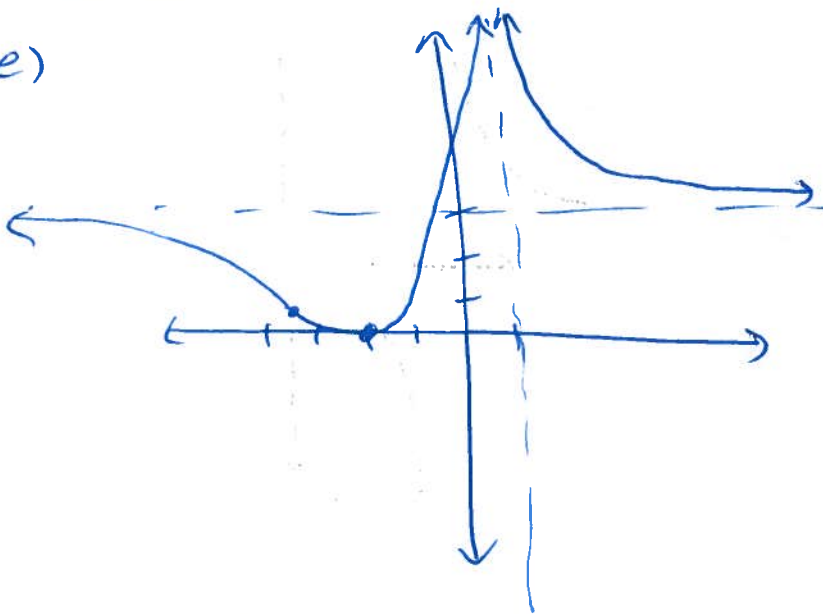
(16) (b) VA: $x=1$, HA: $y=3$



(b) min: $(-2, 0)$
no max

(d) $(-7/2, 1/3)$

(e)



(17) $0, 6\pi \text{ in}^2$

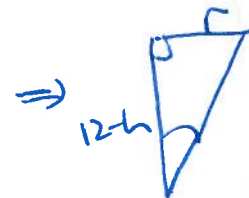
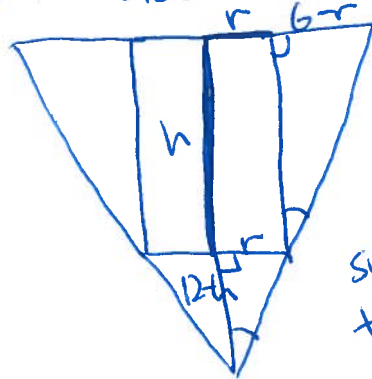
(18) $\sqrt{2} \text{ in}$ by $\sqrt{2} \text{ in}$

(19) $r=4 \text{ in}$
 $h=4 \text{ in}$

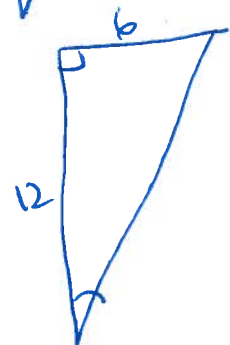
(20) $-\frac{\sqrt{3}}{15} \text{ cm/sec}$

for #19

side view:



similar triangles



$$\Rightarrow \frac{r}{6} = \frac{12-h}{12}$$

$$2r = 12-h$$

$$h = 12-2r$$

$$\text{or } r = 6 - \frac{1}{2}h$$