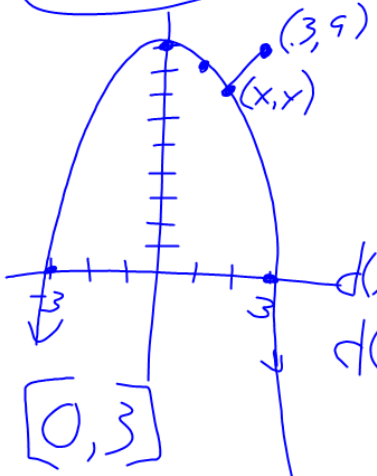
ex 3

$y = 9 - x^2$

(3, 9)




$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(x-3)^2 + (y-9)^2}$

$d(x) = \sqrt{(x-3)^2 + (9 - x^2 - 9)^2}$

$d(x) = \sqrt{(x-3)^2 + x^4} = \sqrt{f(x)}$

$f(x) = [d(x)]^2 = (x-3)^2 + x^4$

$f(0) = 9$

$f(3) = 81$

$f(1) = 5$ min

$f'(x) = 2(x-3) + 4x^3 = 4x^3 + 2x - 6$

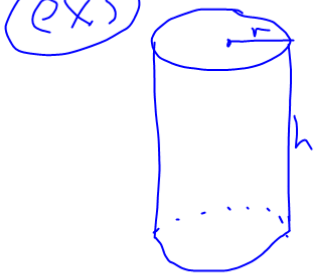
crit #

$x = 1$


(1, 8)

$y = 9 - x^2$

ex 5




$V = 12$ fl. oz.

$V = \pi r^2 h$

$1 \text{ fl. oz} \approx 1.80469 \text{ in}^3$

$12 \text{ fl. oz} \approx 21.65628 \text{ in}^3$

$\frac{21.65628}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$

$\frac{21.65628}{\pi r^2} = h$


Surface Area

$S = 2\pi r^2 + 2\pi r h$

$S(r) = 2\pi r^2 + 2\pi r\left(\frac{21.65628}{\pi r^2}\right)$

$S(r) = 2\pi r^2 + 43.31256 r^{-1}$

$S'(r) = \frac{4\pi r^3}{r^2} - \frac{43.31256}{r^2}$

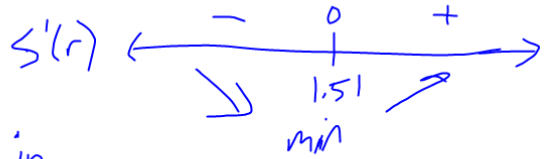
$S'(r) = \frac{4\pi r^3 - 43.31256}{r^2}$

$4\pi r^3 - 43.31256 = 0$

$r^3 = \frac{43.31256}{4\pi}$

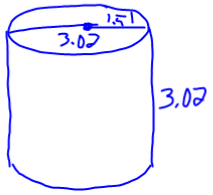
$r = \sqrt[3]{\frac{43.31256}{4\pi}}$

$r \approx 1.51$




radius = 1.51 in

height = 3.02 in




3, 5, 15, 9, 11, 25, 31