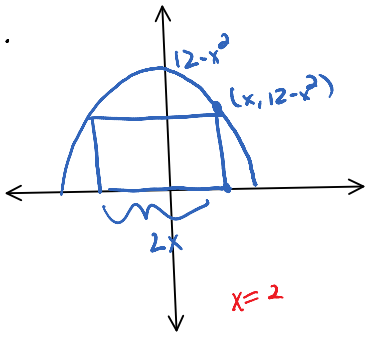
4.4 Day 2

p. 226: 6, 7, 11, 15

Sunday, November 18, 2012
8:02 PM

6.



$0 < x < \sqrt{12}$

$A = 2x(12-x^2)$

$= 24x - 2x^3$

$A' = 24 - 6x^2$

$0 = 24 - 6x^2$

$24 = 6x^2$

$4 = x^2$

$x = \pm\sqrt{4} = \pm 2$ Domain $x = 2$

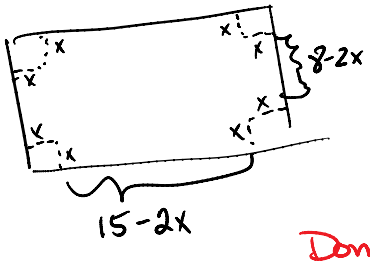
max

P 2 N

Dimensions 4×8

max area 32

7.



$V = x(8-2x)(15-2x)$

$V = 4x^3 - 46x^2 + 120x$

$V' = 12x^2 - 92x + 120 = 4(3x-5)(x-6)$

Domain $(0,4)$ ~~$x = 6$~~ $x = 5/3$

V' max

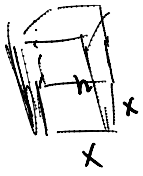
P $5/3$ N

Domain $(0,4)$

Dimensions $\frac{5}{3} \times \frac{14}{3} \times \frac{35}{2}$ in

max volume $\frac{2450}{27} \approx 90.74 \text{ in}^3$

11.



$V = 500 \text{ ft}^3$

minimize the Surface Area

$SA = x^2 + 4 \cdot xh$

$V = x^2 h$ $\quad 500 = x^2 h$ $\quad h = \frac{500}{x^2}$

$SA = x^2 + 4x\left(\frac{500}{x^2}\right)$

$= x^2 + \frac{2000}{x}$ $\quad (2000x^{-1})$

$SA' = 2x + (-2000x^{-2})$

$0 = 2x - \frac{2000}{x^2} \Rightarrow \frac{2000}{x^2} = 2x$ $\quad 2000 = 2x^3$ $\quad 1000 = x^3$ $\quad x = 10$

U

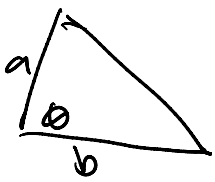
0 10 D

$x = 10$

$h = \frac{500}{10^2} = 5$ ft

dimensions $10 \times 10 \times 5$ ft

15.



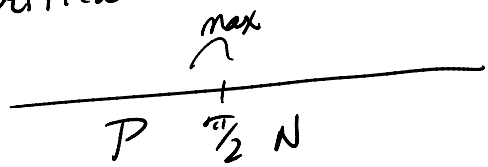
$A = \frac{1}{2} ab \sin\theta$ (constant)

$A' = \frac{1}{2} ab \cos\theta$

$0 = \frac{1}{2} ab \cos\theta$

$\theta \in [0, \pi]$

Critical value $\frac{\pi}{2} = \theta$



$\theta = \frac{\pi}{2}$ or 90°