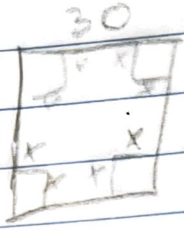
2.5

(14) $V(x) = x(30-2x)(20-2x)$



Max = (3.924, 1056.306)

$L \Rightarrow 20-2x \Rightarrow 20-2(3.924) = 12.152$ in
$W \Rightarrow 30-2x = 30-2(3.924) = 22.152$ in
$H \Rightarrow 3.924$ in

The dimensions to have the biggest box is 12.2 in x 22.2 in x 3.9 in

(16) (a) $120 = 2L + W$

$W = 120 - 2L$

$A = L \cdot W$

$A = L(120-2L)$

$\boxed{A(W) = L(120-2L)}$

(b) $\{L \mid 0 \leq L \leq 60\}$

(c) Max = (30, 1800)

To maximize the area the length needs to be 30 ft and that gives an area of 1800 ft^2

Handout #9

(1)

Volume → $1000 = \pi r^2 \cdot h$

$h = \frac{1000}{\pi r^2}$

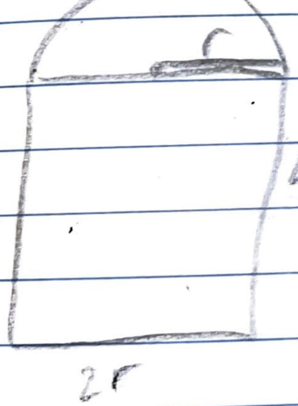
$L(h) = (2)(0.014)(\text{Lid}) + (0.007)(\text{side})$

$(2)(0.014)(\pi r^2) + (0.007)(2\pi r \cdot \frac{1000}{\pi r^2})$

Min = (1.996, 1.052)

Cost is \$1.05 when the can has a radius of 2in and a height of 8in

(2)



A = (Semicircle) + (Rectangle)

$P = (\frac{1}{2} 2\pi r) + (2L + 2r) = 20$

$\frac{1}{2} 2\pi r + 2r - 20 = -2L$

$-\frac{1}{4} 2\pi r - r + 10 = L$

$A(\ ) = (\frac{1}{2}\pi r^2) + (L \cdot 2r)$

$A(L) = (\frac{1}{2}\pi r^2) + (2r(-\frac{1}{4} 2\pi r - r + 10))$

Max = (2.8, 28.005)

The biggest area the window can be is 28.005 ft². The radius of the semicircle is 2.8ft the width of the rectangle is 5.6ft and the length is 28.005ft

(3) A = (width + 2) (height + 3)

A = (W + 2)(H + 3)

48 = WH

$A = (w-2)(h-3)$

$48 = wH$

$w = \frac{48}{h}$

$A = \left(\frac{48}{h} - 2\right)(h-3)$

$Max = (8.485, 20.059)$

$H = 8.485 + 3$

$W = 5.657 + 2$

The size of the paper needs to be 11.485 in x 7.657 in