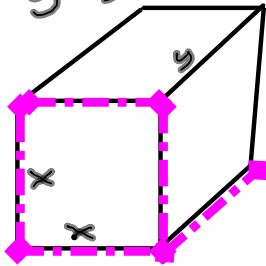


33)

$$x = 18 \text{ in}$$

$$y = 36 \text{ in}$$



$$108 = 4x + y$$

$$V = xxy$$

$$V(x) = x^2(108 - 4x)$$

$$= 108x^2 - 4x^3$$

$$V'(x) = 216x - 12x^2$$

$$0 = 216x - 12x^2$$

$$0 = 12x(18 - x)$$

$$\text{C.P. } 0 + 18$$

2nd deriv Test

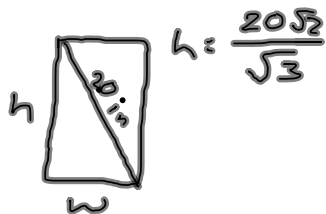
$$V''(x) = 216 - 24x$$

$$\text{min } V''(0) = 216$$

$$\text{max } V''(18) = 216 - 432 = -216$$

43)

$$w = \frac{20}{\sqrt{3}}$$



$$h = \frac{20\sqrt{3}}{\sqrt{3}}$$

$$S = kwh^2$$

$$S = kw(400 - w^2) = 400kw - kw^3$$

$$\frac{dS}{dw} = 400k - 3kw^2$$

$$0 = 400k - 3kw^2$$

$$3w^2 = 400$$

$$\text{2nd deriv. } w = \frac{20}{\sqrt{3}}$$

$$\frac{d^2S}{dw^2}$$

$$= -6w$$

$$\left|_{\frac{20}{\sqrt{3}}} = -\frac{120}{\sqrt{3}}$$

max