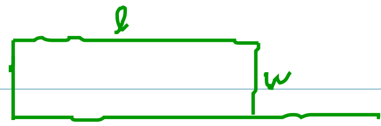


$A = lw$

$= (250 - 1.5w)w$

$= 250w - 1.5w^2$

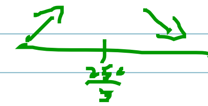
$5000 = 20l + 20w + 10w$

$= 20l + 30w$

$\frac{5000 - 30w}{20} = l$

$\frac{dA}{dt} = 250 - 3w$

$250 - 1.5w = l$



$A'' = -3 < 0$ max

$0 = 250 - 3w$

$\frac{250}{3}\text{ft} = w$

$250 - 1.5\left(\frac{250}{3}\right) = l$

$250 - 125 = l$

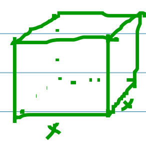
$125\text{ft} = l$

$\left.\frac{dA}{dt}\right|_{w=0} = 250 +$

$\frac{250}{3}\text{ft} \times 125\text{ft}$

$\left.\frac{dA}{dt}\right|_{w=100} = 250 - 300 = -50$

$A = 10{,}416.\bar{6}\ \text{ft}^2$



$V = lwh = 32{,}000\text{cm}^3$

$= x^2h =$

$h = \frac{32000}{x^2}$

$SA = x^2 + 4xh = x^2 + 4x\left(\frac{32{,}000}{x^2}\right) = x^2 + \frac{128{,}000}{x}$

$SA' = 2x - \frac{128000}{x^2}$

$0 = 2x - \frac{128{,}000}{x^2}$

$64{,}000 = x^3 \qquad x = 40\cancel{00}$

$\cancel{h = \frac{32000}{(4000)^2} = \frac{32000}{16000000}}$

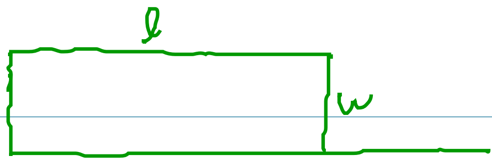
$SA'' = 2 + 2\left(\frac{128{,}000}{x^3}\right)$

$SA''(4000) = + > 0$ min

$\cancel{4000\text{cm} \times 4000\text{cm} \times 0.002\text{cm}}$

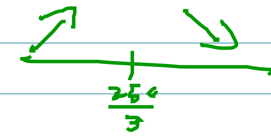
$h = \frac{32000}{(40)^2} = \frac{32000}{1600} = 20$

$\boxed{40\text{cm} \times 40\text{cm} \times 20\text{cm}}$



$A = lw$
$= (250 - 1.5w)w$
$= 250w - 1.5w^2$

$5000 = 20l + 20w + 10w$
$= 20l + 30w$
$\frac{5000 - 30w}{20} = l$



$\frac{dA}{dt} = 250 - 3w$

$250 - 1.5w = l$

$A'' = -3 < 0$
max

$0 = 250 - 3w$
$\frac{250}{3}\text{ft} = w$

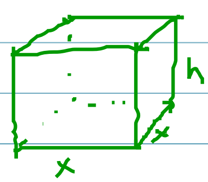
$250 - 1.5\left(\frac{250}{3}\right) = l$
$250 - 125 = l$
$125\text{ft} = l$

$\left.\frac{dA}{dt}\right|_{w=0} = 250 +$

$\frac{250}{3}\text{ft} \times 125\text{ft}$

$\left.\frac{dA}{dt}\right|_{w=100} = 250 - 300 = -50$
$-$

$A = 10{,}416.\bar{6}\ \text{ft}^2$



$V = lwh = 32{,}000\text{cm}^3$
$= x^2h =$

$h = \frac{32000}{x^2}$

$SA = x^2 + 4xh = x^2 + 4x\left(\frac{32{,}000}{x^2}\right) = x^2 + \frac{128{,}000}{x}$

$SA' = 2x - \frac{128000}{x^2}$

$0 = 2x - \frac{128{,}000}{x^2}$

$64{,}000 = x^3$ $\qquad x = 40\cancel{00}$

$\cancel{h = \frac{32000}{(4000)^2} = \frac{32000}{16000000}}$

$SA'' = 2 + 2\left(\frac{128{,}000}{x^3}\right)$

$SA''(4000) = + > 0$ min

~~4000cm x 4000cm x 0.002cm~~

$h = \frac{32000}{(40)^2} = \frac{32000}{1600} = 20$

$\boxed{40\text{cm} \times 40\text{cm} \times 20\text{cm}}$

$y = \sqrt{x}$ $\qquad (3, 0)$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
$$= \sqrt{(x-3)^2 + (y-0)^2}$$
$$= \sqrt{(x-3)^2 + (\sqrt{x})^2}$$
$$= \sqrt{x^2 - 6x + 9 + x}$$
$$= \sqrt{x^2 - 5x + 9}$$

$$d' = \frac{1}{2}(x^2 - 5x + 9)^{-1/2}(2x - 5)$$
$$= \frac{2x - 5}{2\sqrt{x^2 - 5x + 9}}$$

$0 = 2x - 5 \qquad x = \frac{5}{2} \qquad y = \sqrt{\frac{5}{2}}$

$d'(0) = \frac{-5}{6} < 0$

$d'(3) = \frac{1}{2\sqrt{3}} > 0$

$\searrow \quad \nearrow$

$\frac{5}{2}$
min

$$\boxed{\left(\frac{5}{2}, \sqrt{\frac{5}{2}}\right)}$$

<u>Cost</u> – $C(x) = xp_1 + p_2$

<u>Marginal cost</u> – $MC = C'(x) = p_1$

<u>Demand</u> – $p(x)$

<u>Revenue</u> – $R(x) = xp(x)$

<u>Marginal Revenue</u> – $MR = R'(x) = xp'(x) + p(x)x'$
$$= xp'(x) + p(x)$$

<u>Profit</u> – $P(x) = R(x) - C(x)$

<u>Marginal Profit</u> – $MP = P'(x) = R'(x) - C'(x)$