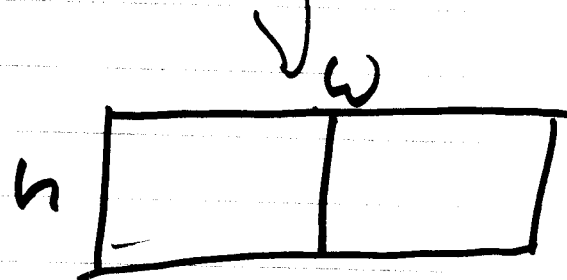
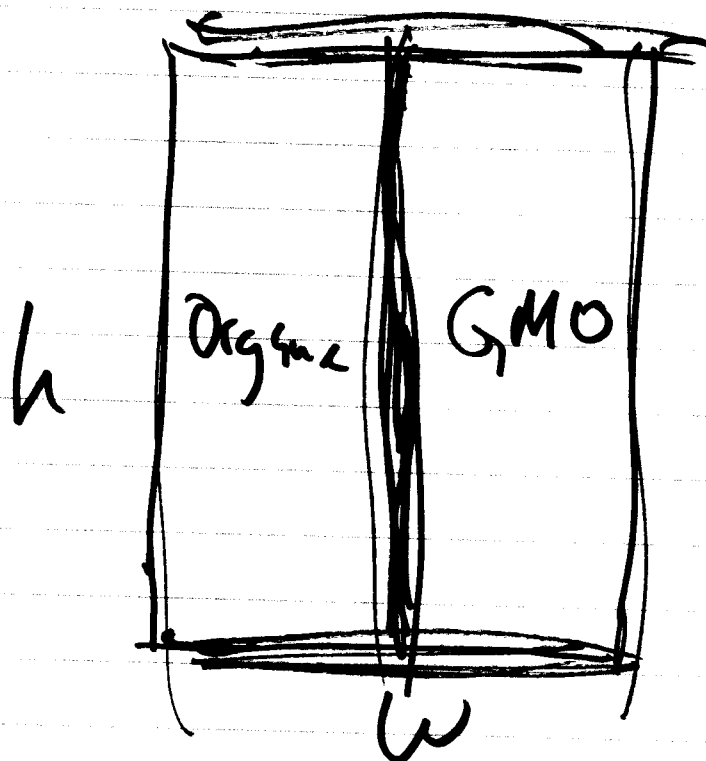


10/23

1500 ^{sq ft} 1.5

Area A ~~1500~~

thick
fence



$$w \cdot h = A$$

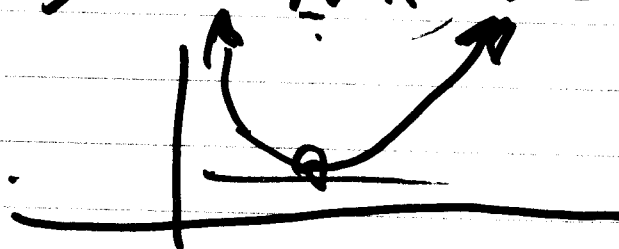
$$w = \frac{A}{h} = Ah^{-1}$$

Minimize Fence Length L

$$L(h) = \underline{3h} + 2w = \underline{3h} + 2Ah^{-1}$$

$$L'(h) = 3 - 2Ah^{-2} = 0$$

$L(h)$



$$h = \sqrt{\frac{3}{2A}}$$

$$L(h) = 3h + 2Ah^{-1}$$

$$L'(h) = 3 - 2Ah^{-2} = 0$$

$$3 = \frac{2A}{h^2} \quad \text{or} \quad 3h^2 = 2A$$

$$h^2 = \frac{2A}{3}$$

$$h = \sqrt{\frac{2A}{3}}$$

$$h^{-1} = \sqrt{\frac{3}{2A}} = \frac{\sqrt{3}}{\sqrt{2A}}$$

$$L = 3 \cdot \sqrt{\frac{2A}{3}} + 2A \cdot \frac{\sqrt{3}}{\sqrt{2A}}$$

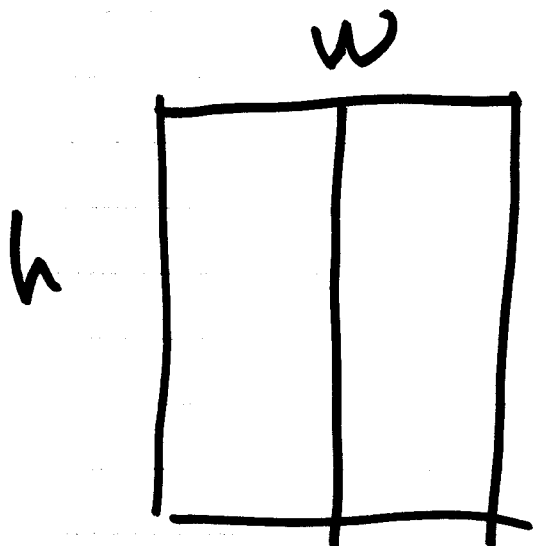
$$= 2\sqrt{3} \sqrt{2A}$$

$$\frac{x}{\sqrt{x}} = \sqrt{x}$$

$$A = 500000$$

$$L = 7745.9666$$

$$L = 7745.960 \dots$$



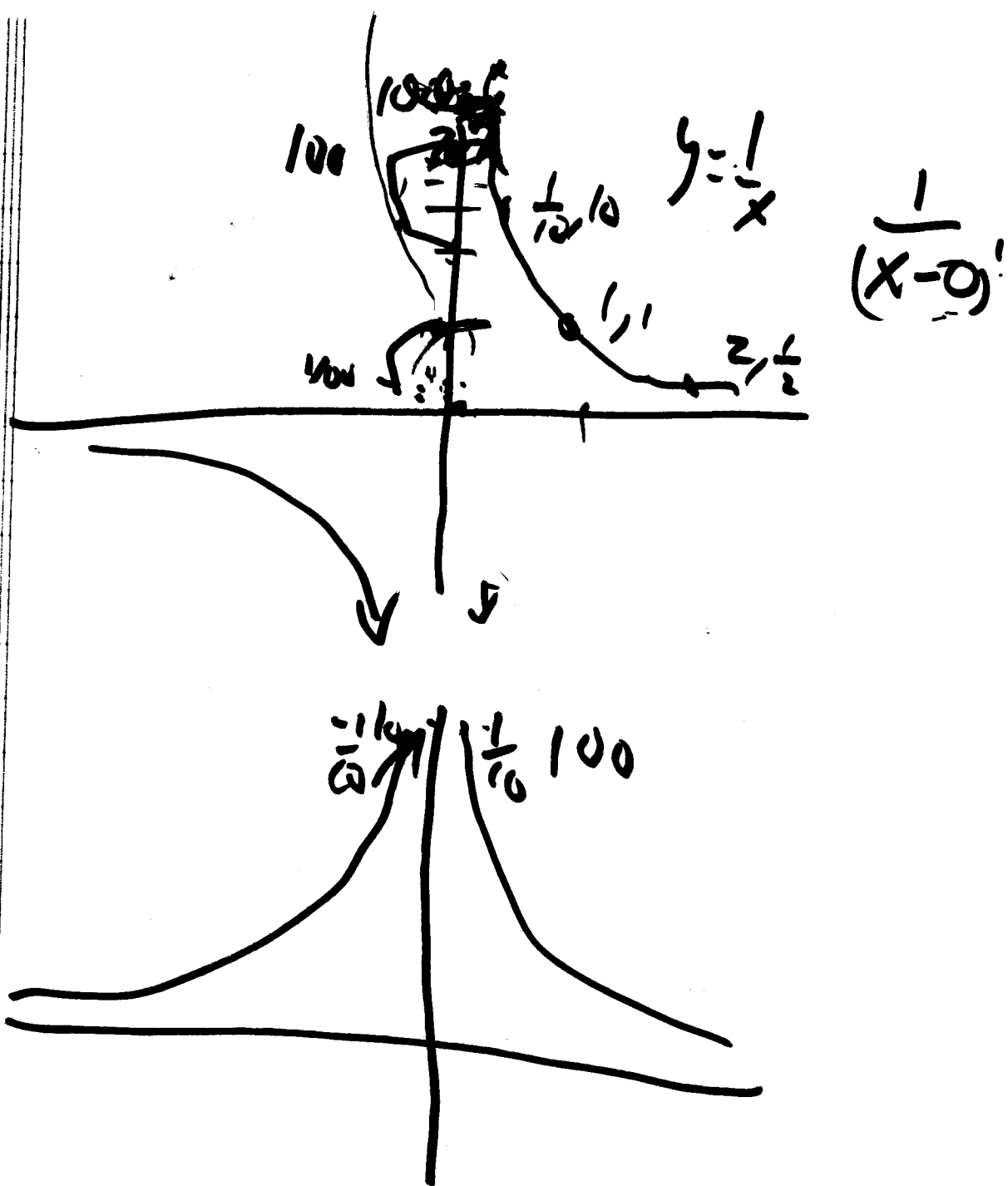
$$3h + 2w = L \quad w = \frac{L - 3h}{2}$$

Maximize $A = h \underline{w}$

$$\underline{A(h)} = h \cdot \left(\frac{L - 3h}{2} \right) = -\frac{3}{2}h^2 + \frac{L}{2}h$$

$$A'(h) = -3h + \frac{L}{2} = 0 \text{ when}$$

$$h = \frac{L}{6} \quad A = \frac{L}{6} \left(L - \frac{L}{2} \right) \overset{3h = L/2}{=} \frac{3L^2}{24}$$



After class: ^{Stuck question} "Integrate by parts"
Complete the product

$$f(x) = \ln x$$

$$f'(x) = \frac{1}{x} = x^{-1}$$

$$\int x^{-1} dx = \ln x + c$$

$$\int \underline{\ln x} \, dx$$

$$(x \cdot \ln x)' = \underline{1 \cdot \ln x} + \underline{x \cdot \frac{1}{x}}$$

$$\int \ln x = \int (x \cdot \ln x)' - \int x \cdot \frac{1}{x}$$

$$= x \cdot \ln x - x + c$$

$$(x \cdot \ln x - x + C)'$$

$$1 \cdot \ln x + x \cdot \frac{1}{x} - 1 + 0$$

$$\underline{\underline{1 \cdot \ln x + 1 - 1 = 0}}$$

$$\int \frac{f' \cdot g}{\ln x}$$

$$= \int (fg + fg') - fg'$$

$$\int (fg)'$$

$$= fg - \int fg'$$

$$x \cdot \ln x - \int x \cdot \frac{1}{x}$$