Thursday, January 3, 2019 12:28 PM

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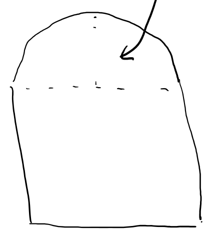

84

$w = 84$

$l = 168$

600' fencing

maximize area inside corral

$$\text{Area} = \frac{1}{2}\pi r^2 + wl = \frac{1}{2}\pi\left(\frac{l}{2}\right)^2 + wl$$

$$= \frac{\pi l^2}{8} + wl$$

$$\text{Perimeter: } 2w + l + \frac{\pi l}{2} = 600$$

$$2w = 600 - l - \frac{\pi l}{2}$$

$$w = 300 - \frac{l}{2} - \frac{\pi l}{4} \rightarrow w = 84$$

$$A = \frac{\pi l^2}{8} + \left(300 - \frac{l}{2} - \frac{\pi l}{4}\right) l$$

$$= \frac{\pi l^2}{8} + 300 l - \frac{l^2}{2} - \frac{\pi l^2}{4}$$

$$= l^2\left(-\frac{\pi}{8} - \frac{1}{2}\right) + 300 l$$

$$\frac{dA}{dl} = 2l\left(-\frac{\pi}{8} - \frac{1}{2}\right) = -300$$

$$2l = \frac{300}{\frac{\pi}{8} + \frac{1}{2}} \qquad l = \frac{150}{\frac{\pi}{8} + \frac{1}{2}}$$

$$l = 168$$

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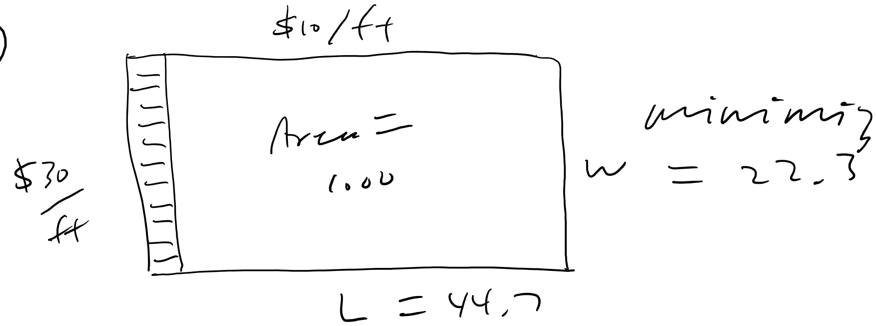

minimize cost

$$wL = 1000 \qquad w = 1000/L = 1000L^{-1}$$

$$\text{cost: } 40w + 20L =$$

$$\text{cost} = 40{,}000L^{-1} + 20L$$

$$w = \frac{1000}{44.721} = 22.3$$

$$\frac{dC}{dL} = -40{,}000L^{-2} + 20 = 0$$

$$\frac{40{,}000}{L^2} = 20$$

$$2{,}000 = L^2 \qquad L = \sqrt{2000} = 44.721$$

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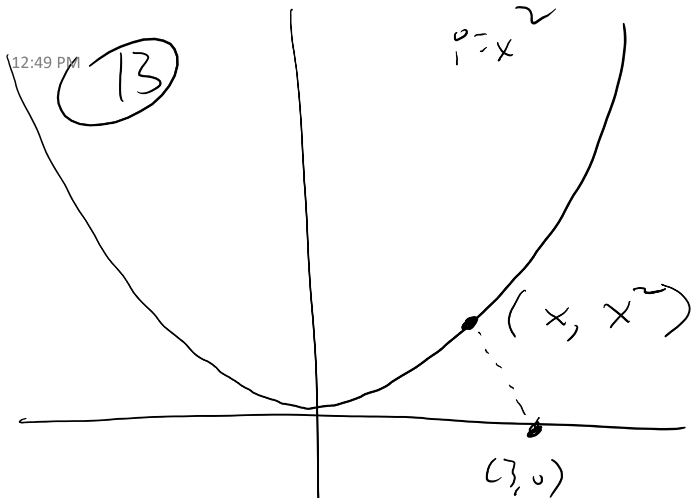

Distance formula: $\sqrt{(x^2-0)^2 + (x-3)^2}$

$$D = (x^4 + x^2 - 6x + 9)^{1/2}$$

$$\frac{d(D)}{dx} = \frac{1}{2}(x^4+x^2-6x+9)^{-1/2} \cdot (4x^3+2x-6)$$

$$= \frac{2x^3+x-3}{\sqrt{x^4+x^2-6x+9}} = 0$$

$(1,1)$ is closest to $(3,0)$

AP Problem

c) $\frac{dy}{dx} = \frac{y}{3y^2 - x}$ $\frac{d^2y}{dx^2} = \frac{d}{dx}\left(\frac{y}{3y^2-x}\right)$

$$= \frac{(3y^2 - x)\cdot y' - y(6yy' - 1)}{(3y^2 - x)^2}$$

b) $3y^2 - x = 0$ $x = 3y^2$

$$y^3 - xy = 2$$

$\boxed{265: 1-4}$