Name Key

AP Calculus AB Severson

3.7 Homework Quiz

1. Find the length and width of a rectangle with perimeter 60 meters and maximum area.

$x+y=30$

$A=xy$

$A=x(30-x)$

$A=30x-x^2$

$A'=30-2x$

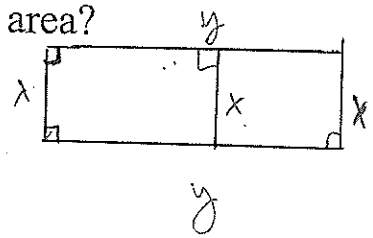
$0=30-2x$

$x=15$

$l=15m$

$w=15m$

2. A farmer has 360 feet of fencing to enclose two adjacent rectangular corrals. What dimensions should be used to maximize the enclosed area?



$3x+2y=360$

$2y=360-3x$

$y=180-1.5x$

$A=xy$

$A=x(180-1.5x)$

$A=180x-1.5x^2$

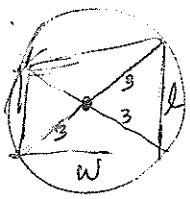
$A'=180-3x$

$0=180-3x$

$60=x$

$\boxed{\text{60 ft long by 90 ft wide}}$

3. Find the area of the largest rectangle that can be created inside a circle of radius 3 feet.



$l^2+w^2=6^2$

$l=\sqrt{36-w^2}$

$A=lw$

$A=\sqrt{(36-w^2)}\,w$

$A=18ft^2$

$A'=(36-w^2)^{\frac{1}{2}}\cdot 1+w\left[\frac{1}{2}(36-w^2)^{-\frac{1}{2}}\cdot -2w\right]$

$0=\sqrt{36-w^2}-\frac{w^2}{\sqrt{36-w^2}}$

$\frac{w^2}{\sqrt{36-w^2}}=\frac{\sqrt{36-w^2}}{1}$

$w^2=36-w^2$

$2w^2=36$

$w^2=18$

$w=\sqrt{18}$ or $3\sqrt{2}$

$l=3\sqrt{2}$

4. The sum of the perimeters two squares is 24. Find the dimensions of the squares that produce the minimum total area.

$4x+4y=24$

$x+y=6$

$A=x^2+y^2$

$A=x^2+(6-x)^2$

$A'=2x+2(6-x)(-1)$

$2(6-x)=2x$

$6-x=x$

$6=2x$ $x=3$ $y=3$

Both squares should be 3x3 squares.