Answers to Worksheet 13 - Optimization

1) A = the total area of the two corrals x = the length of the non-adjacent sides of each corral

Function to maximize: $A = 2x \cdot \frac{500 - 4x}{3}$ where $0 < x < 125$

Dimensions of each corall: $\frac{125}{2}$ ft (non-adjecent sides) by $\frac{250}{3}$ ft (adjacent sides)

2) L = the total length of rope x = the horizontal distance from the short pole to the stake

Function to minimize: $L = \sqrt{x^2 + 4^2} + \sqrt{(9 - x)^2 + 8^2}$ where $0 \le x \le 9$

Stake should be placed: 3 ft from the short pole (or 6 ft from the long pole)

3) p = the profit per day x = the number of items manufactured per day

Function to maximize: $p = x(130 - 0.05x) - (40x + 6000)$ where $0 \le x < \infty$

Optimal number of smartphones to manufacture per day: 900

4) V = the volume of the box x = the length of the sides of the squares

Function to maximize: $V = (16 - 2x)(10 - 2x) \cdot x$ where $0 < x < 5$

Sides of the squares: 2 in

5) A = the area of the rectangle x = half the base of the rectangle

Function to maximize: $A = 2x\sqrt{5^2 - x^2}$ where $0 < x < 5$

Area of largest rectangle: 25

6) d = the distance from point $(5, 0)$ to a point on the curve x = the x-coordinate of a point on the curve

Function to minimize: $d = \sqrt{(x - 5)^2 + (\sqrt{x})^2}$ where $-\infty < x < \infty$

Point on the curve that is closest to the point $(5, 0)$: $\left(\frac{9}{2}, \frac{3\sqrt{2}}{2}\right)$

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