2.6 Optimization Problems Worksheet

This document was composed and formatted by Annie Bernatchez.

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1) A rectangular pen is to be built with 1200 m of fencing. The pen is to be divided into three parts using two parallel partitions. Find the max possible area of the pen.

2) A showroom for a car dealership is to be built in the shape of a rectangle with brick on the back and sides, and glass on the front. The floor of the showroom is to have an area of 500 m^2. If a brick wall costs \$1200/m while a glass wall costs \$600/m, what dimensions would minimize the cost of the showroom? What is the min cost?

3) A soup can is to have a capacity of 250 cm^3 and the diameter of the can must be no less than 4 cm and no greater than 8 cm. What are the dimensions of the can that can be constructed using the LEAST amount of material?

4) A rectangular piece of paper with perimeter 100 cm is to be rolled to form a cylindrical tube. Find the dimensions of the paper that will produce a tube with maximum volume. What is the max volume?

5) Find the area of the largest rectangle that can be inscribed between the x-axis and the graph defined by $y = 9 - x^2$.

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6) For an outdoor concert, a ticket price of \$30 typically attracts 5000 people. For each \$1 increase in the ticket price, 100 fewer people will attend. The revenue, R, is the product of the number of people attending and the price per ticket. Let x equal the number of \$1 increases in price. Find the ticket price that maximizes the revenue. What is the max revenue?

7) A train leaves the station at 10:00 a.m. and travels due south at a speed of 60 km/h. Another train has been heading due west at 45 km/h and reaches the same station at 11:00 a.m. At what time were the two trains closest together?

Answer Key

1) 45 000 m^2

2) 19.4 m by 25.8 m; min cost is \$92 952

3) $r = 3.41$ cm and $h = 6.83$ cm

4) $\frac{50}{3}$ cm by $\frac{100}{3}$ cm; volume is 1473.7 cm^3

5) $12\sqrt{3}$ $units^2$

6) \$40; max revenue is \$160 000

7) 0.36 hours after the first train left the station (10:22 am)

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