

TAKE HOME FINAL - 203 SUMMER '11

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Manapua Food Truck

We are considering where to open up a manapua truck in three different locations. Site A has a manapua demand equation of $p(s) = 10e^{\frac{-s}{1000}}$ and a per manapua tax of 10 cents. Site B has a manapua demand equation of $p(s) = 10e^{\frac{-s}{1700}}$ and a per manapua tax of 15 cents. Site C has a demand equation of $p(s) = 10e^{\frac{-s}{100}}$ with no tax. For sites *A* and *B* you may use a computer to find zeros of a function however, for site C you must algebraically find all of your results and a decimal approximation found by graphing will not be accepted.

Honolulu Zoo Extravaganza

As a class, we have decided to manage the Honolulu Zoo. With our new found power, we have decided to release most of the animals into the Hawaiian jungle (what a great idea!), except for lions and the hippos. We find out that the cost of running the Zoo is completely determined by the number of hippos and the number of lions by the equation $C(x) = 400 + 2x + 3y + .01(3x^2 + xy + 3y^2)$ where x is the number of hippos and y is the number of lions. Our revenue is completely determined by the number of adult tickets we sell (\$10 each) and the number of children's tickets we sell (\$9 each). Also, we notice that the number of adult tickets we sell is exactly the number of hippos we have, and the number of children's tickets we sell is exactly the number of lions we have. How many lions and hippos do we need to have to maximize profit? (hint: profit=revenue-cost).