Math 101 (03): Homework #13

due Tuesday, Nov.16

All even problems from Chapter 8 (pages 74-76).

2. What is the shape of the cheapest open-top cylindrical can of given volume V if the base material costs half as much as the side material?

4. A student has two straight 4-foot pieces of fence for a triangular pen along dormitory. How much area can she enclose?

6. A farmer pays a boy \$3 per hour to sell peas after school from 3 p.m. on.

(a) He sells $12t - (3/2)t^2$ pounds, where t is the number of hours since 3 p.m. The farmer makes \$1/pound. How long should the farmer have the boy work?

(b) Suppose he sells $2t - (1/4)t^2$ pounds?

8. Find the point on the parabola $y = x^2/2$ that is closest to the point $(4, 1)$.

10. If you pick your oranges on January 1 (when each tree yields 130 pounds of oranges) you can get 16 cents per pound at market. The yield increases at a rate of 5 pounds per tree per week, but the market price decreases 1/2 cent per pound per week. When should you pick the oranges to make the most money?

12. A rectangular cardboard poster for advertising calculus in Berlin is to contain 216 square inches of printed material with 2 inch margins at the sides and 3 inch margin at the top and bottom. Find the dimensions of the poster to use the least possible amount of cardboard.

14. If a man throws a ball at an angle θ, the distance it will travel is equal to $(v\cos\theta)(2\frac{v}{g}\sin\theta)$, where v is the speed he throws it and g is the acceleration of gravity. For given v and g, what angle should he throw it to maximize the distance?