

8. The Dobbs Hotel will provide a dinner party for a minimum of 100 couples at \$50 per couple. If more than 100 couples attend, the hotel will refund every couple \$.25 for every couple over 100. How many couples will maximize the hotel's revenue?
9. A poster is to contain 50 square inches of printed matter with margins of 4" each at the top and bottom and 2" at each side. Find the *overall* dimensions if you want a minimum total area.
10. An oil can is to be made in the form of a right circular cylinder to contain  $16\pi$  cubic inches. What dimensions of the can will require the least amount of material, while meeting this requirement for volume. (Recall that for a cylinder,  $V = \pi r^2 h$ , and area of a circle  $A = \pi r^2$ .)
11. The yield of orange trees is reduced if they are planted too close together. If there are 30 trees per acre, each tree produces 400 oranges. For each additional tree in the acre, the yield is reduced by 7 oranges per tree. How many trees per acre yield the largest crop for farmer Boyles?
12. A rectangular box is to be made from a piece of cardboard 24 inches long and 9 inches wide by cutting out identical squares from the four corners and turning up the cardboard to form the sides. What size square should you cut off of each corner to maximize the volume of the box? What is this maximum volume?
13. Rancher Sellers has 80 ft. of fence with which he plans to enclose a rectangular pen along one side of his 100 ft. barn (the side along the barn needs no fence). What are the dimensions that would maximize the area? What is the maximum area?
14. A handbill is to contain 50 square inches, with 4 inch margins at the top and bottom and 2 inch margins on each side. What dimensions for the handbill would give the largest printed area?
15. A man with 300 m of fencing wishes to enclose a rectangular area and divide it into 5 pens with fences parallel to one side. (See figure at right)...
- What dimensions would maximize the area?

