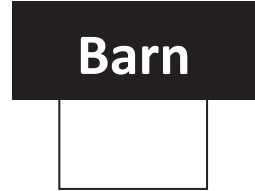


## Optimization Word Problems

1. A rancher has 200 meters of fencing with which to enclose two adjacent corrals, one smaller and one larger as shown in the picture. What should the outer dimensions be so that the enclosed area is a maximum?



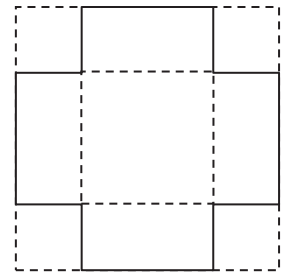
2. A farmer has a barn that is 50 feet long. He has 200 ft of fence with which to enclose a rectangular garden one of whose sides is to be along the barn. What are the dimensions of the largest garden that can be enclosed?



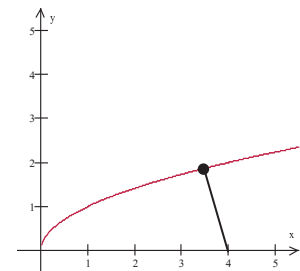
3. Find two positive numbers such that the product is 192 and the sum of the first and three times the second is a minimum.

$xy=192$

4. An open box is to be made from a square piece of material, 24 cm on a side, by cutting out equal squares from each corner and turning up the sides. What will be the volume of the largest such box?



5. Find the point on the graph of  $f(x) = \sqrt{x}$  that is closest to the point (4, 0).



6. Walmart wants to design a cylindrical can for their Great Value brand of corn niblets that uses the least amount of metal but holds 341 mL of corn. What should the height and radius of the can be?  
Note that  $1 \text{ cm}^3 = 1 \text{ mL}$ .



7. An open box with a square base is to have a volume of  $12,000 \text{ cm}^3$ . The material for the bottom of the box costs  $\$6/\text{cm}^2$  while the material for the sides of the box costs only  $\$2/\text{cm}^2$ . What should the dimensions of the box be to minimize the total cost?

