HW Pre Calculus 11 Ch2 Optimization Problems

For each of the questions below, write the two equations to solve the problem. Solve each equation algebraically by completing the square or by finding the vertex. Show all your work and steps

1. Two numbers have a difference of 9. If one number is represented using "x", then what is the other value in terms of "x"?

2. Two numbers have a sum of 11. If one number is represented using "x", then what is the other value in terms of "x"?

3. Two numbers have a difference of 8. If the product of the two numbers if a minimum, then what are the two numbers?

4. The numbers have a sum of 8. If the product of the two numbers is a maximum, then what are the two numbers?

5. If two numbers "a" and "b" have a sum of 10, then will the product of the two numbers have a maximum or a minimum? Explain. Justify your answer

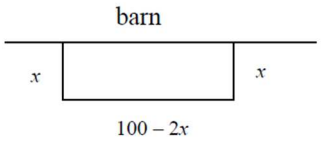
6. If two numbers "a" and "b" have a difference of 10, then will the product of the two numbers have a maximum or a minimum? Explain. Justify your answer

7. Two number have a difference of 12. If the sum of their squares is a minimum then what are the two numbers? Also, find the minimum sum of their squares.

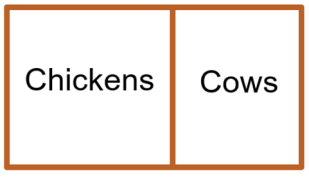
8. A rectangle has a perimeter of 36cm. What is the maximum area of the rectangle?

9. A rectangular garden is to be created with fencing placed on three side of it, with the fourth side next to a building. If you have 80meters of fencing, then what is the largest garden that you can create?

10. A farmer wants to create an rectangular area for his chickens to rest. The rest area is next to a barn and will have 100feet of fencing to surround it. What is the largest area that the farmer can create?

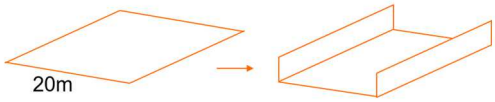


11. A farmer wants to create a rectangular barn for his cows and chickens as shown below. The farmer has 200feet of fencing to surround the barn and also to separate the cows and chickens. What is the largest area that the farmer can create?



12. 6000 meters of fencing is used to create the rectangular shape below. Fencing is used for every line segment shown. What is the largest area that you can create?

13. A rectangular sheet that is 20cm wide is bent into a trough as shown. How high should the trough be to maximum the volume of the trough?



14. A piece of wire is 36cm in length. It is to be cut into two pieces and then each piece is to be bent into a square. How should the string be cut so that the sum of the two areas is as small as possible.

15. A "Normal window" is a rectangle with a semi-circle on top. If the perimeter of the window is 24feet, then what dimensions will maximize the area of the window?

16. Suppose the number of ice-creams a store can sell is "x" and the price is $(300-x)$. What is the maximum revenue that the store can generate from selling ice-cream?

17. A car company has found that the amount of monthly revenue generated "R", is a function of the unit price of each car, "p". $R = -\frac{1}{2}p^2 + 2000p$. What unit price should be charged to generate the maximum revenue?

18. Ship A is 50 miles west of ship B. Ship A is heading east at 10km per hour and ship B is heading south at 5 km per hour. Find the minimum distance between the two ships? How long will it take for the minimum distance to occur?

19. If the base of a triangle is "x" and the height is "20 – x", then what is the maximum area of the triangle?

20. A right triangle, with a base of 300m and height of 400m encloses a rectangle as shown. Find the dimensions of the maximum rectangle? Extension: If the height of the triangle is "A" and the base is "B", find the dimensions of the maximum rectangle in terms of "A" and "B".