Quiz #6a

Name:_____
StudentID:_____
Major:_____
Time: 20 minutes.

Justify your solutions and show all your steps. Write down formulae used. Make sure to look on the back side of this sheet.
Consider a right triangle as sketched with sides $a = 9$, $b = 40$, $c = 41$. You want to inscribe a rectangle as indicated with sides x and y. We will find out how to choose x and y, to maximize the area of the rectangle.

1. Write down the equation of the area $A(x, y)$ of the rectangle depending on x and y.

2. Express y in terms of x.

3. Express the area of the rectangle in terms of x (that is only depending on the variable x). You will get a function $A(x)$.

4. Find the first and second derivative of the function $A(x)$.

5. Use this to find the maximal and/or minimal point(s) of $A(x)$.

6. How do you have to choose x and y to maximize the area of the rectangle?

7. What is this maximal area?