Math 105 91A [1] January 19th, 19100 Worksheet 3

http://www.math.ubc.ca/~ athreya/105

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1. Suppose $U(x, y) = xy + 2x$ and the constraint equation is $2x + y = 30$ Find the minimum value of U and the corresponding values of x and y subject to this later constraint.

2. A horse racing track is in the shape of an ellipse. It is given by the equation

$$\frac{x^2}{(20)^2} + \frac{y^2}{(10)^2} = 1$$

The owner of the track wants to build a rectangular stable in the area enclosed by the track. What is the largest stable he can build ? What fraction is this of the area of the ellipse?

3. Our favourite bug Squirmy is moving on the curve C given by the equation

$$x^2 + 2xy + 3y^2 = 9$$

What is the closest distance to the origin that the bug can get ? The farthest distance?

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[1] **Office hours:** Monday:2:30-3:30pm, Tuesday:3:30-4:30 pm, Wednesday: 10:30-11:30 am