TEST PREP on 14.7 - Dr. Loveless

Test Prep Reminder: These problems are *directly* from old exams. I made a large collection of problems for you to study, the intention is to spend a few minutes on the first problem at the start of quiz section. Then study the others for more practice later. I hope this is helpful to give you a chance to see what exam questions will be like.

PARTICIPATION CODE: Don't forget to ask your TA for the participation code! Enter this on Test Prep Quiz for today on Canvas before the end of quiz section!

Problem below is from Winter 2016 - Exam 2 - Dr. Loveless (*this was a full page of that exam, a good goal is to try to complete it in under 10 minutes*).

2. (10 pts) Let $f(x, y) = 4xy - 3y + \dfrac{1}{x} - \dfrac{1}{4}\ln(y)$. Find and classify all the critical points of $f(x, y)$. **Clearly** show your work in using the second derivative test.

More local max/min questions on this page...
Problem below is from Spring 2011 - Exam 2 - Dr. Loveless (this was a full page)

2. (9 pts) Let $f(x, y) = x^2y - x^2 - 2y^2$. Find and classify all critical points of $f(x, y)$. (Classify using appropriate partial derivative tests).

Problem below is from Spring 2013 - Exam 2 - Dr. Loveless (this was half a page)

1(b) (8 pts) Let $f(x, y) = \dfrac{9}{x} + 3xy - y^2$. Find and classify all critical points of $f(x, y)$. (Classify using appropriate partial derivative tests).

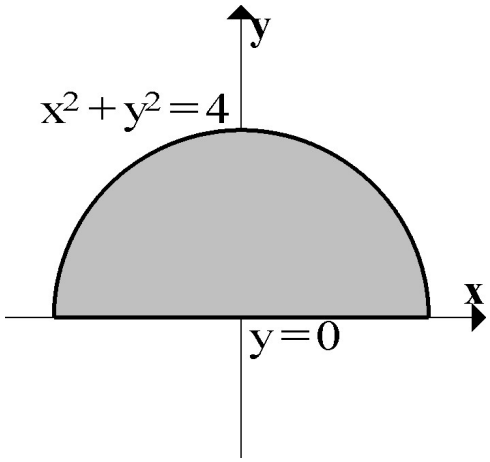
Global max/min questions on this page...
Problem below is from Spring 2011 - Exam 2 - Dr. Loveless (this was half a page)

4. Consider the region $D = \{(x, y) \mid x \leq 0,\ y \geq 0,\ x^2 + y^2 \leq 9\}$.

   (a) (7 pts) Find the absolute maximum and absolute minimum of $f(x, y) = yx^2 + 10$ over D.

Problem below is from Spring 2014 - Exam 2 - Dr. Loveless (this was a full page)

4. (14 pts) Find the absolute maximum and minimum values of $f(x, y) = y(x^2 + y^2) - 2y^2 + 1$ over the region D shown below.



Applied max/min questions on this page...
Problem below is from Spring 2013 Honors - Exam 2 - Dr. Loveless (this was a full page)

4. (13 pts)You are designing a cage to hold your pet rabbits. The cage is a rectangular box with a bottom, four sides, and one divider in the middle (you are keeping the males and females apart). There is no top. A picture of such a cage is below.

   If you want the total combined volume to be 12 cubic feet, then what dimensions will minimize the total material used?
   Give your final dimensions as decimals to four digits. As part of your answer, **use the second derivative test** to verify that your critical point is a local minimum.