

Name: _____

Test Prep — 14.7 (Local and Global Max/Min) — Math 126

Participation:

- +1: show written work from at least one 14.7 homework problem
- +1: participate in this test prep

Start: Work on the first problem on your own for a few minutes, then discuss with your group, then check with your TA. The rest of the test prep gives examples of every type of 14.7 problem. I intend you to do page 1, then save the rest for later (unless you are done with the 14.3 and 14.4 assignments and have already started 14.7 in which case feel free to move to page 2).

Problem below is from Winter 2016 - Exam 2 - Dr. Loveless (see solutions in the archive)

2. (10 pts) Let $f(x, y) = 4xy - 3y + \frac{1}{x} - \frac{1}{4}\ln(y)$.

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 Again only continue if you are done with 14.4 HW and have started 14.7 (otherwise switch to homework).

Problem below is from Spring 2011 - Exam 2 - Dr. Loveless

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

1(b) (8 pts) Let $f(x, y) = \frac{9}{x} + 3xy - y^2$.

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

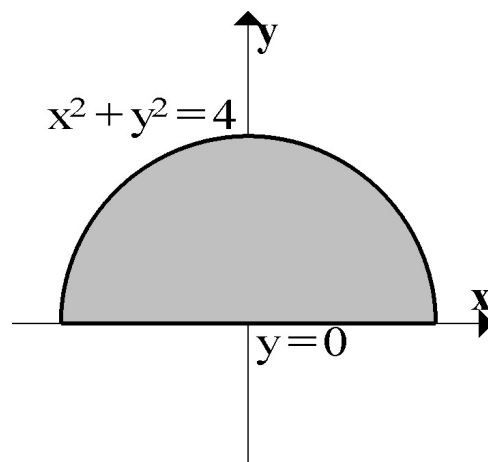
4. Consider the region

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

(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

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 question...

Problem below is from Spring 2013 - Exam 2 - Dr. Loveless

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.

If the total volume is 12 cubic feet, what dimensions 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.

