

Name:

ID:

Discussion Section:

This exam has 14 questions:

- 12 multiple choice worth 5 points each.
- 2 hand graded worth 40 points total.

Important:

- No graphing calculators!
- For the multiple choice questions, mark your answer on the answer card.
- Show all your work for the written problems. You will be graded on the ease of reading your solution.
- You are allowed a 3×5 note card for the exam.

1. Which of the following best describes the domain of the function $f(x, y) = \ln(x^2 + y^2 - 1)$?

- (a) All of the xy -plane
- (b) All of the xy -plane except the origin
- (c) All of the xy -plane except a circle
- (d) The area inside a circle, including the circle
- (e) The area inside a circle, not including the circle
- (f) The area outside a circle, including the circle
- (g) The area outside a circle, not including the circle
- (h) The first quadrant
- (i) The first and third quadrants

2. Which of the following equations describes a level curve of the function $f(x, y) = e^{x^2 - y}$?

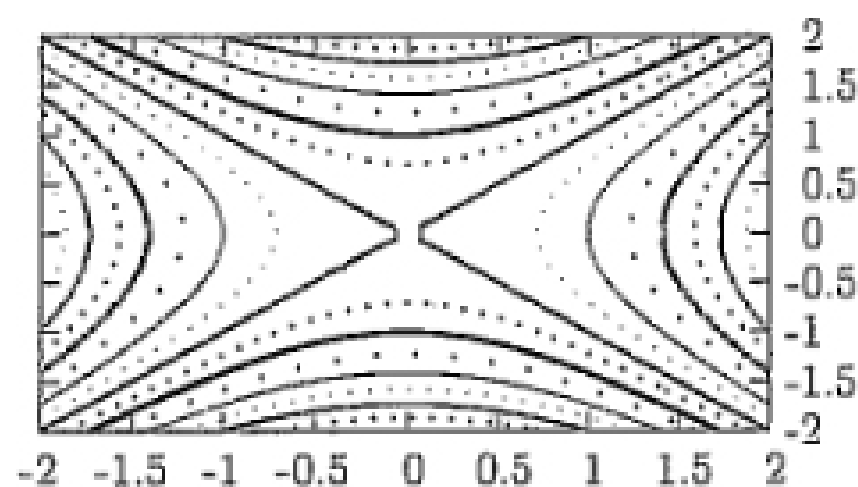
- (a) $\ln y = e^{x^2}$
- (b) $y = x^2$
- (c) $y = x$
- (d) $y = 2x$
- (e) $y = 2xe^{x^2}$
- (f) $y = e^{-x^2}$
- (g) $y = \ln(x)$
- (h) $y = \ln(x^2)$
- (i) $y = e^x$
- (j) $y = e^{x^2}$

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3. Which of the following functions corresponds to the contour map below?



- (a) $f(x, y) = x + y$
(b) $f(x, y) = x^2 + y^2$
(c) $f(x, y) = x^2 - y^2$
(d) $f(x, y) = 1 - x^2 - y^2$
(e) $f(x, y) = xy$
4. Let $f(x, y) = \ln(x^2y)$. What is $\frac{\partial f}{\partial x}$ at the point $(1, 2)$?
- (a) 0
(b) $1/8$
(c) $1/4$
(d) $1/2$
(e) $\ln 2$
(f) 1
(g) $\ln 4$
(h) $e/2$
(i) 2
(j) e

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5. Let $f(x, y, z) = 2x^2 + 3xy + 5y^2 + z^2 - 2z$. Which of the following is a critical point of f ?
- (a) $(0, 0, 0)$
 - (b) $(0, 0, 1)$
 - (c) $(0, 0, 3)$
 - (d) $(1, -1, 0)$
 - (e) $(1, -1, 1)$
 - (f) $(1, 1, -1)$
 - (g) $(1, 1, 1)$
 - (h) $(2, 0, 2)$
 - (i) $(2, 5, 1)$
 - (j) $(3, 3, 2)$
6. The function $f(x, y) = x^2 + 6y^2 + 4xy - 2x + 4y$ has one critical point. What is the value of $f(x, y)$ at the critical point?
- (a) -12
 - (b) -9
 - (c) -3
 - (d) -1
 - (e) 0
 - (f) 1
 - (g) 3
 - (h) 9
 - (i) 12