MATH 2242-090 — Spring 2016 — Dr. Clontz — Quiz 4

Name: Solution

- Each quiz question is labeled with its worth toward your total quiz grade for the semester.
- On multiple choice problems, you do not need to show your work. No partial credit will be given.
- On full response problems, show all of your work and give a complete solution. When in doubt, don't skip any steps. Partial credit will be given at the discretion of the professor.
- This quiz is open notes and open book.
- This quiz is due at the end of class. Quizzes submitted over one minute late will be penalized by 50%.

1. (10 points) Give an approximate value of $f(1.1, -2.1)$ given the following information about f:

$$f(1,-2)=3 \qquad \frac{\partial f}{\partial x}(1,-2)=1 \qquad \frac{\partial f}{\partial y}(1,-2)=-2$$

$$\frac{\partial^2 f}{\partial x^2}(1,-2)=0 \qquad \frac{\partial^2 f}{\partial y^2}(1,-2)=3 \qquad \frac{\partial^2 f}{\partial x \partial y}(1,-2)=1$$

$$f(1.1,-2.1) \approx f(1,-2) + \frac{\partial f}{\partial x}(1,-2)(1.1-1)$$
$$+ \frac{\partial f}{\partial y}(1,-2)(-2.1-2) + \frac{1}{2}\frac{\partial^2 f}{\partial x^2}(1,-2)(1.1-1)^2$$
$$+ \frac{1}{2}\frac{\partial^2 f}{\partial y^2}(1,-2)(-2.1-2)^2 + \frac{\partial^2 f}{\partial x \partial y}(1,-2)(1.1-1)(-2.1-2)$$

$$= 3 + 1(0.1) + (-2)(-0.1) + \frac{1}{2}(0)(0.1)^2$$
$$+ \frac{1}{2}(3)(-0.1)^2 + 1(0.1)(-0.1)$$

$$= 3 + 0.1 + 0.2 + 0.015 - 0.01$$

$$= 3.305$$