

### Basic Information

This assignment is due on Gradescope by **3 PM on Tuesday, November 26**.

Make sure you understand MHC [honor code](#) and have carefully read and understood the additional information on the [class syllabus](#). I am happy to discuss any questions or concerns you have!

Since this is a 200-level mathematics course, quite a few homework questions will ask you to explain your reasoning or process for solving a problem. Whenever possible, write your explanations in complete sentences and write your answers as if you were explaining to a peer in the class.

The homework problems will be graded anonymously so please do not put your name or other identifying information on the pages.

### Turn In Problems

14.1: 16

14.3: 8, 12. (Just set up #12, no need to integrate it.)

#4<sup>1</sup>. Find the gradient vector field of  $f(x, y) = xe^{xy}$ .

#5. On the next page are plots of 4 vector fields. Match those with the vector fields listed below:

(a)  $\vec{F}(x, y) = \langle 1, 2, 3 \rangle$

(c)  $\vec{F}(x, y) = \langle x, y, 3 \rangle$

(b)  $\vec{F}(x, y) = \langle 1, 2, z \rangle$

(d)  $\vec{F}(x, y) = \langle x, y, z \rangle$

#6. For the following vector fields, either show they are not conservative or find a potential function for them.

(a)  $\vec{F}(x, y, z) = \langle \cos(xz), \sin(yz), xy \sin z \rangle$

(b)  $\vec{F}(x, y, z) = \langle y^2, 2xy + e^z, ye^z \rangle$

### Additional Problems (to do on your own, not to turn in)

14.1: 15

14.3: 9, 11

- Find the gradient vector field of  $f(x, y) = \tan(3x - 4y)$ .
- For the following vector fields, either show they are not conservative or find a potential function for them.

(a)  $\vec{F}(x, y, z) = \langle \cos z, 2y, -x \sin z \rangle$

(b)  $\vec{F}(x, y) = \langle xe^y, ye^x \rangle$

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<sup>1</sup> #4 and 5, and the last problem in the additional problems section are from Stewart Calculus 6th edition, pages 1032 and 1043.

