

Reading Assignment # 8

Math 13 - Prof. Orellana

January 23, 2009

Read Sections 3.2, 3.3 and 3.4

Don't forget to let me know the pages where you found the answers.

1. Define a vector field and explain how one would sketch a vector field in \mathbb{R}^2 or \mathbb{R}^3 . Give an example and sketch it.
2. What is the inverse square vector field in \mathbb{R}^3 ? Tell me what its direction is and its magnitude.
3. Define a gradient field and a potential function. What does the remark in page 210 say?
4. What is an equipotential set?
5. Define a flow line and sketch the vector field in Exercise 1 and indicate a flow line.
6. Define divergence and read the last paragraph in page 215 and tell me how I can intuitively think about the divergence.
7. When you take the divergence of a vector field, what type of function do you get?
8. What does "incompressible" vector field mean? Give an example of an incompressible vector field (you can use theorem 4.4 to construct one) and one that is not.
9. Define the curl of a vector field. Read the last paragraph of page 217 and explain what curl measures.
10. What does it mean for a vector field to be irrotational? Give an example of an irrotational vector field (you can use Theorem 4.3 to construct one) and one that is not irrotational.
11. State Theorem 4.3 and Theorem 4.4.