

# Reading Assignment # 18

Math 13 - Prof. Orellana

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Read Sections 6.3

Don't forget to let me know the pages where you found the answers. You should write full sentences when you do these assignments to help you study from them before the next exam.

1. Define what it means for a vector line integral to be path-independent.
2. Give an example of a vector field that does not have a path-independent vector line integral.
3. According to example 2 what would you have to do to check to show that a vector field has a line integral that is path-independent?
4. Read Theorem 3.2 and tell me what it says.
5. Suppose that you had to come up with an example of a vector field that is path-independent, how would you construct an example using Theorem 3.3?
6. State Theorem 3.3, this theorem is usually called the Fundamental Theorem of line integrals.
7. What does it mean to say that a region is simply connected? Draw one that is simply connected and one that is not. Why is this important?
8. Theorem 3.5 gives you a test for determining when a vector field is path independent, state this theorem precisely.
9. If  $\mathbf{F}(x, y) = M(x, y)\mathbf{i} + N(x, y)\mathbf{j}$  is just a two-dimensional vector field, how can you test whether it is a gradient vector field, for this you should read the paragraph before Example 4.
10. Read Examples 7 and 8 and write the steps to find the potential function of a gradient vector field.