

Assignment 9

Coverage: 16.2, 16.3 in Text.

Exercises: 16.2 no 41, 42, 43. 16.3 no 2, 5, 9, 11, 15, 16, 18, 20, 27, 29, 32, 33.

Hand in 16.2 no 42, 43; 16.3 no 11, 16, 20 by November 16.

Supplementary Problems

This problem is optional.

1. A region is called star-shaped if there is a point O inside so that the line segment connecting any point in this region to O lies completely in this region. For simplicity take O to be the origin.

(a) Show that in case the vector field \mathbf{F} admits a potential g in this region, then

$$g(x, y, z) = \int_0^1 \mathbf{F}(tx, ty, tz) \cdot (x\mathbf{i} + y\mathbf{j} + z\mathbf{k}) dt .$$

(b) Show that when \mathbf{F} passes the component test, the above formula defines a potential function for \mathbf{F} .