

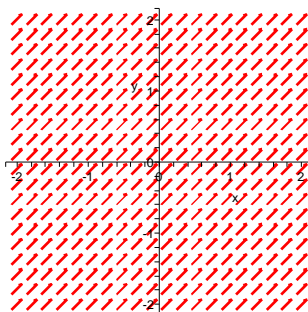
Solutions to Homework Assignment 27

MATH 249

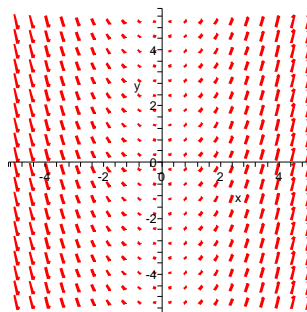
Section 16.1 Stewart 6e, Page 1032

1, 2, 6, 11-18, 21, 23, 26, 29-32

1. These all point in the same direction, so the vector field won't have any "swirling" going on.
2. The larger x gets, the more this will rise. When x is negative, these will point down and to the right. The "slope" of each vector is just the value of x . Note that on the y -axis, these are all horizontal.



Number 1



Number 2

- 11-14. The vectors for Number 14 should rise or fall very steeply near the y -axis, so I will put III with 14. In 12, the x -component is always 1, but the y -component oscillates. This matches IV. In 13, when x is near 2, the x -component of \vec{F} is nearly 0, so the slopes are very large. This matches I. (Likewise, for x near -1 , the slopes should be very small.) This leaves only II for Number 11, which seems to match.
- 15-18. In 15, \vec{F} is constant; only IV matches this. In 16, \vec{F} depends only on z , and the larger z gets, the more the vectors point up. When z is negative, the vectors point down. This matches I. In 17, the z -component is always 3. This does not match II (since some of those vectors point down), so it must match III. This leaves only II for Number 18.

23.
$$\nabla f(x, y, z) = \frac{1}{\sqrt{x^2 + y^2 + z^2}} \langle x, y, z \rangle.$$