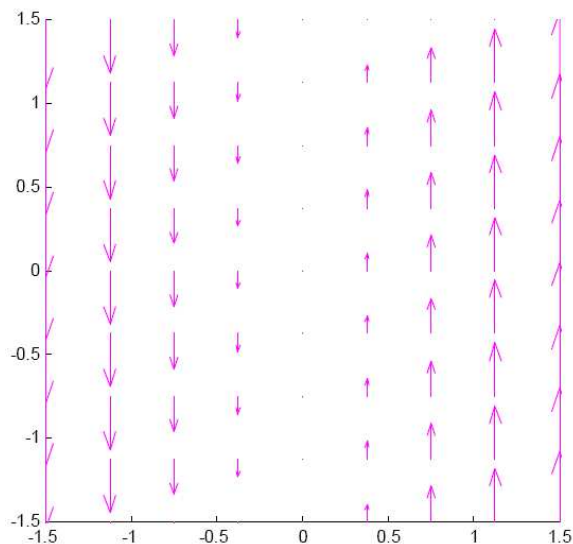


Classroom Voting Questions: Multivariable Calculus

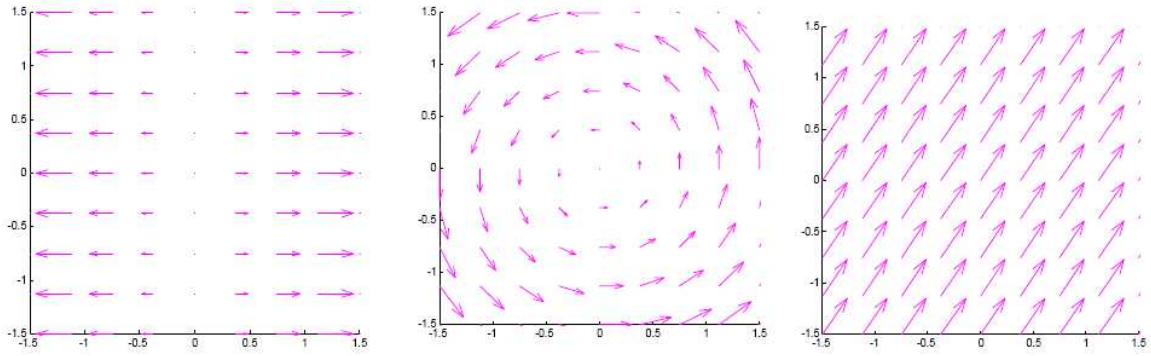
17.3 Vector Fields

1. Which of the following could be a formula for the vector field pictured?



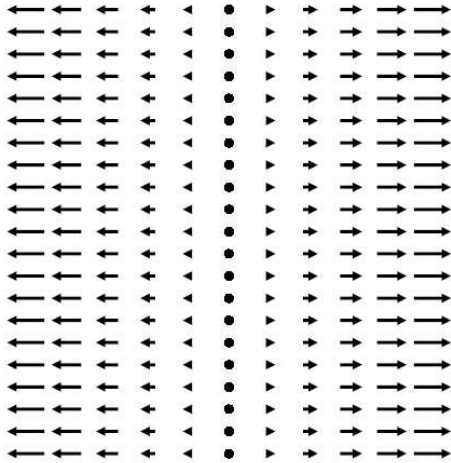
- (a) $\vec{F}(x, y) = x\hat{i}$
(b) $\vec{F}(x, y) = y\hat{i}$
(c) $\vec{F}(x, y) = x\hat{j}$
(d) $\vec{F}(x, y) = y\hat{j}$
2. Which of the following formulas will produce a vector field where all vectors point away from the y axis and all vectors on a vertical line have the same length?
- (a) $\vec{F}(x, y) = x^3\hat{i}$
(b) $\vec{F}(x, y) = x^2\hat{i}$
(c) $\vec{F}(x, y) = x^3\hat{j}$
(d) $\vec{F}(x, y) = x^2\hat{j}$

3. Which of the following vector fields cannot be a gradient vector field?



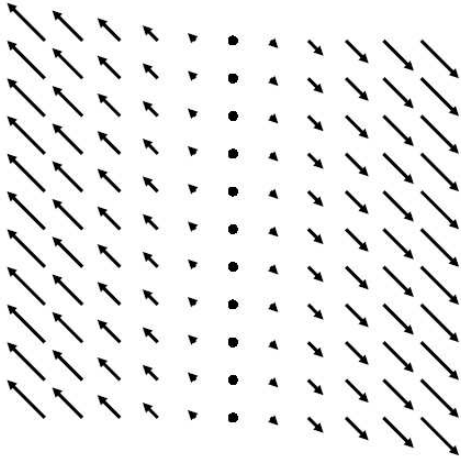
- (a) the one on the left
- (b) the one in the middle
- (c) the one on the right

4. Which formula below could produce the graph of the vector field:



- (a) $f(x)\hat{i}$
- (b) $g(x)\hat{j}$
- (c) $h(y)\hat{i}$
- (d) $k(y)\hat{j}$

5. Which formula below could produce the graph of the vector field:



- (a) $f(x)\hat{i} + f(x)\hat{j}$
- (b) $g(x)\hat{i} - g(x)\hat{j}$
- (c) $h(y)\hat{i} + h(y)\hat{j}$
- (d) $k(y)\hat{i} - k(y)\hat{j}$

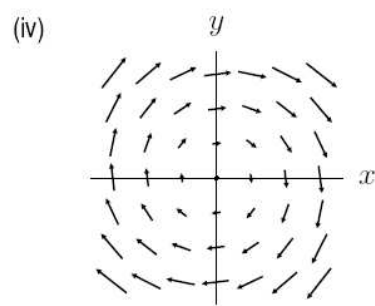
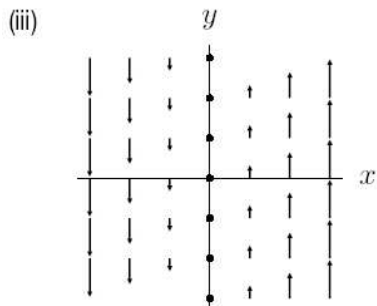
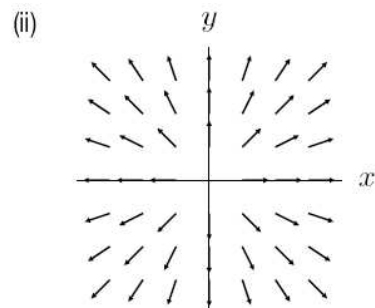
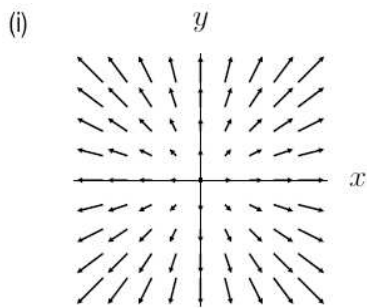
6. Match the vector fields with the appropriate graphs.

1 $\vec{F}_1 = \frac{\vec{r}}{\|\vec{r}\|}$

2 $\vec{F}_2 = \vec{r}$

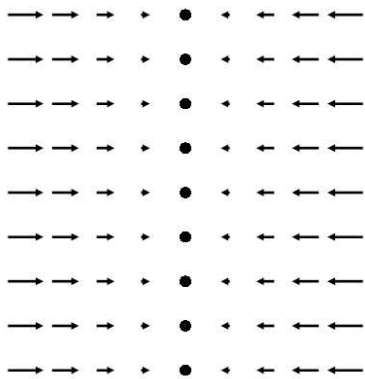
3 $\vec{F}_3 = y\hat{i} - x\hat{j}$

4 $\vec{F}_4 = x\hat{j}$



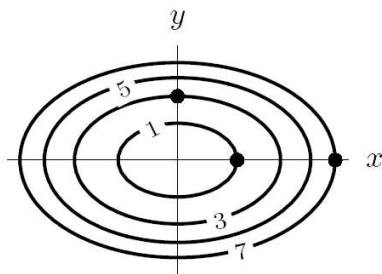
- (a) 1 and III, 2 and I, 3 and IV, 4 and II
- (b) 1 and IV, 2 and I, 3 and II, 4 and III
- (c) 1 and II, 2 and I, 3 and IV, 4 and III
- (d) 1 and II, 2 and IV, 3 and I, 4 and III
- (e) 1 and I, 2 and II, 3 and IV, 4 and III

7. The figure shows the vector field $\vec{F} = \nabla f$. Which of the following are possible choices for $f(x, y)$?



- (a) x^2
- (b) $-x^2$
- (c) $-2x$
- (d) $-y^2$

8. Rank the length of the gradient vectors at the points marked on the contour plot below.



- (a) $7 > 5 > 3 > 1$
- (b) $1 > 3 > 5 > 7$
- (c) $7 > 1 > 3 > 5$
- (d) $3 > 1 > 7 > 5$