MA 213 Worksheet #20
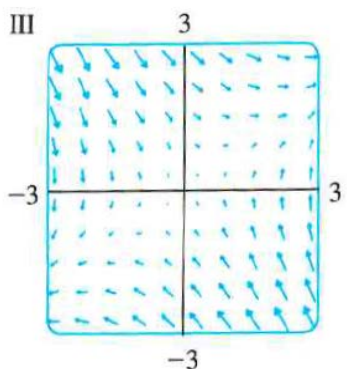
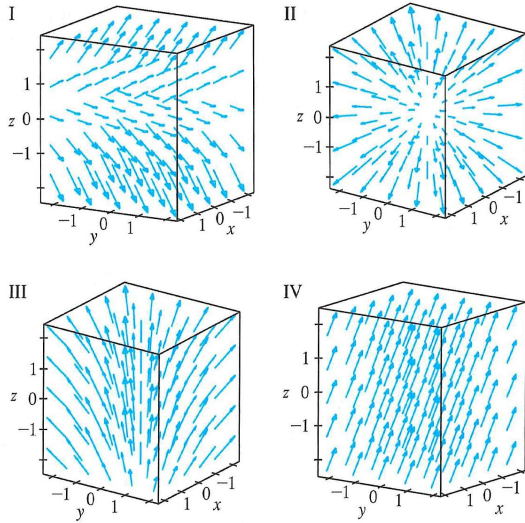**1** *16.1.11-14* Match the vector fields, **F**, with the plots below. Give reasons for your choices.

(a) $\mathbf{F}(x, y) = \langle x, -y \rangle$

(b) $\mathbf{F}(x, y) = \langle y, x - y \rangle$

(c) $\mathbf{F}(x, y) = \langle y, y + 2 \rangle$

(d) $\mathbf{F}(x, y) = \langle \cos(x + y), x \rangle$
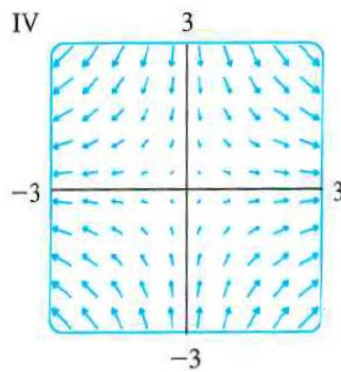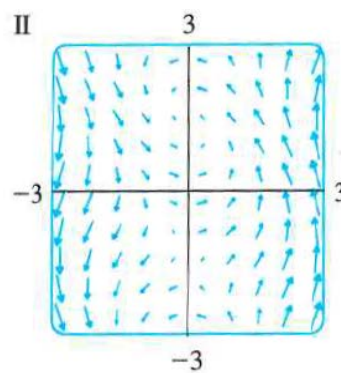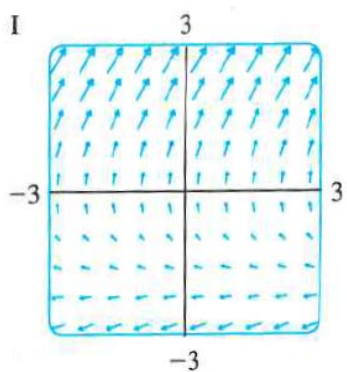
2 *16.1.25* Let $f(x, y) = \frac{1}{2}(x - y)^2$. Find the gradient vector field, ∇f, of f and sketch it.

3 *16.1.15-18* Match the vector fields, **F**, with the plots below. Give reasons for your choices.

(a) $\mathbf{F}(x, y, z) = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$

(b) $\mathbf{F}(x, y, z) = \mathbf{i} + 2\mathbf{j} + z\mathbf{k}$

(c) $\mathbf{F}(x, y, z) = x\mathbf{i} + y\mathbf{j} + 3\mathbf{k}$

(d) $\mathbf{F}(x, y, z) = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$

4 *16.1.29-32* Match the functions, f, with the plots of their gradient vector fields below. Give reasons for your choices.

(a) $f(x, y) = x^2 + y^2$

(b) $f(x, y) = x(x + y)$

(c) $f(x, y) = (x + y)^2$

(d) $f(x, y) = \sin \sqrt{x^2 + y^2}$