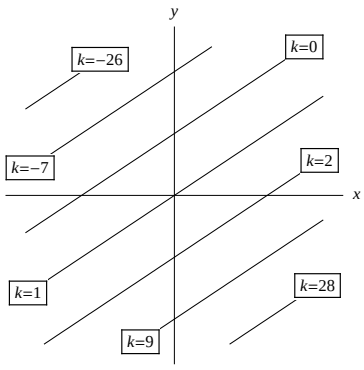
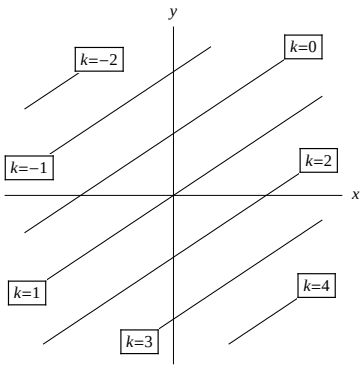
Matching Exercises
September 17

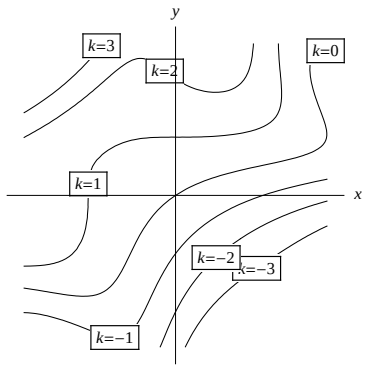
1. The first row shows contour of three graphs $z = f(x, y)$ in the planes $z = k$. (Contours of the graph $z = f(x, y)$ in $z = k$ are also known as level sets of $f(x, y)$.) Match each diagram with the graph of the function.



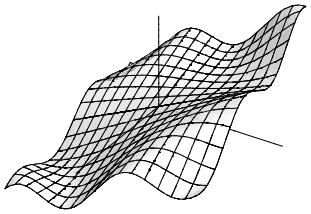
(I)



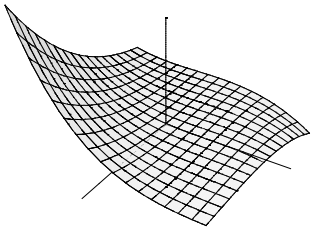
(II)



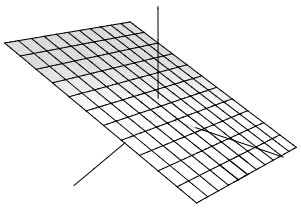
(III)



(a)

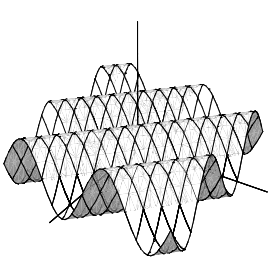


(b)

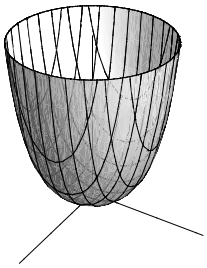


(c)

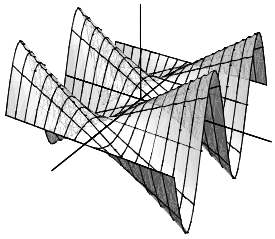
2. Here are several surfaces.



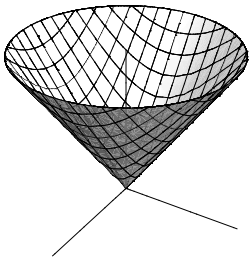
(I)



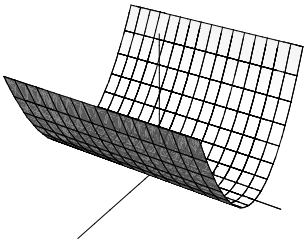
(II)



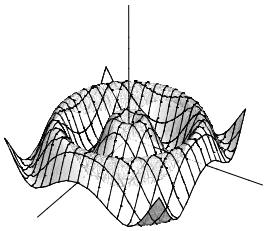
(III)



(IV)



(V)



(VI)

Match each function with its graph.

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

(b) $f(x, y) = \sqrt{x^2 + y^2}$.

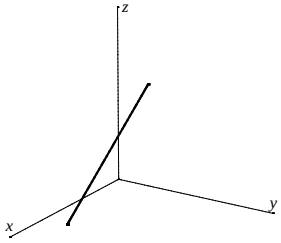
(c) $f(x, y) = e^{x^2+y^2} - 1$.

(d) $f(x, y) = y \sin x$.

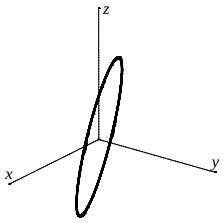
(e) $f(x, y) = \sin(x + y)$.

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

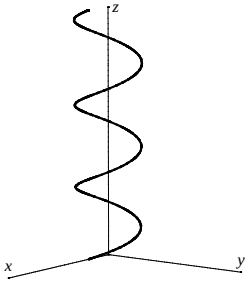
3. Here are several curves.



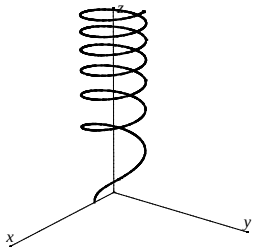
(I)



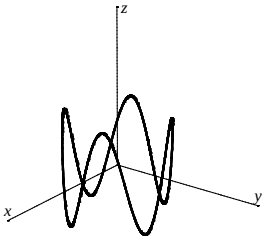
(II)



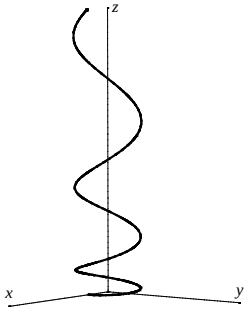
(III)



(IV)



(V)



(VI)

Find the curve parameterized by each vector-valued function.

(a) $\vec{r}(t) = \langle \cos t, \sin t, t \rangle$.

(b) $\vec{r}(s) = \langle \cos s, \sin s, \sin 4s \rangle$.

(c) $\vec{r}(s) = \langle \cos s, \sin s, 4 \sin s \rangle$.

(d) $\vec{r}(u) = \langle \cos u^3, \sin u^3, u^3 \rangle$.

(e) $\vec{r}(u) = \langle 3 + 2\cos u, 1 + 4\cos u, 2 + 5\cos u \rangle$.