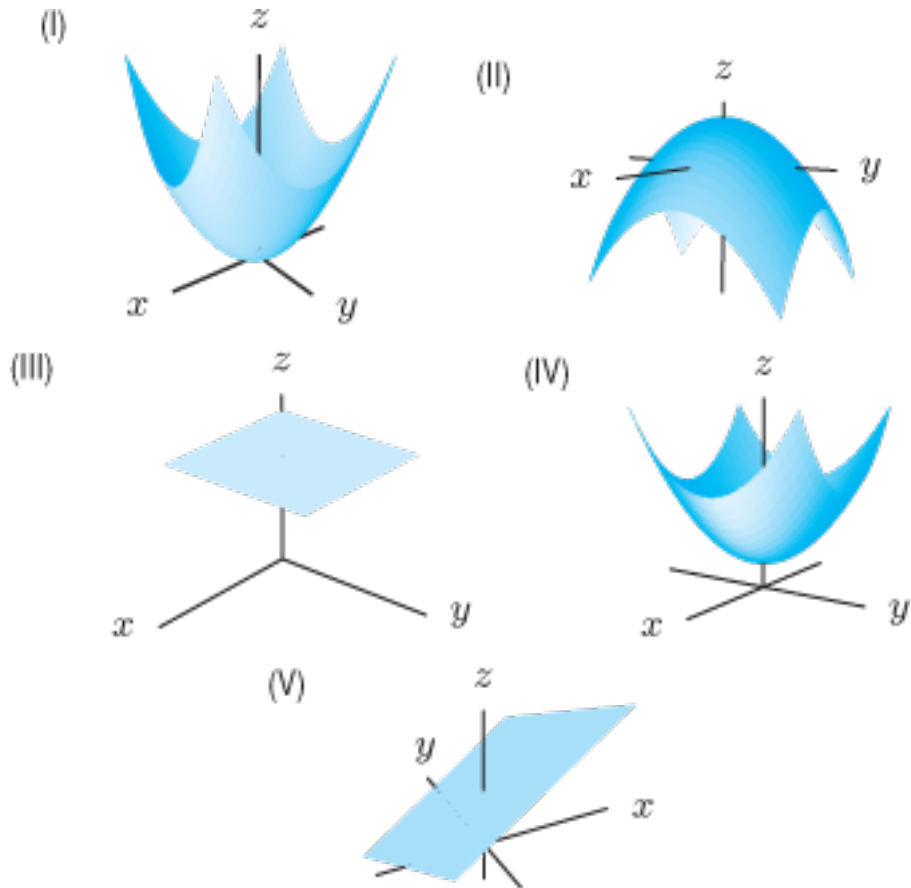# 12.2 Graphs and Surfaces

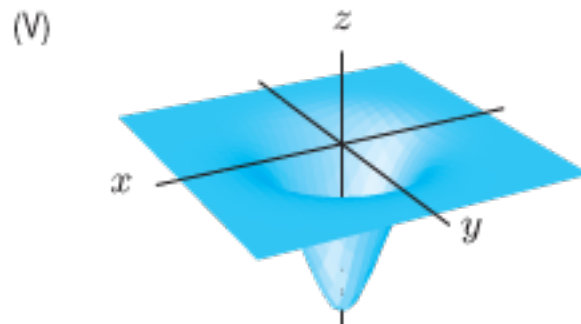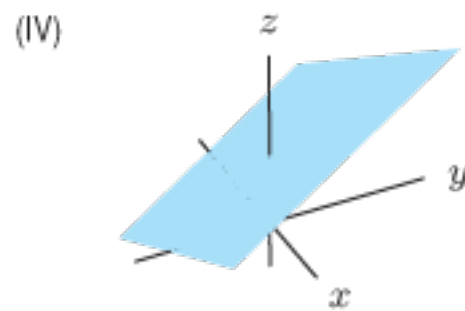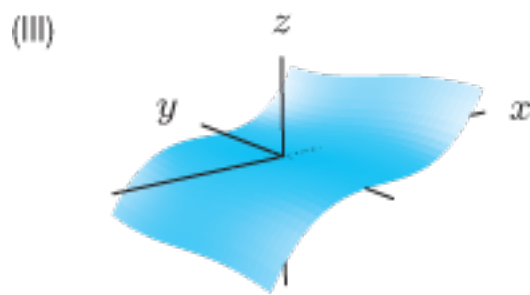Name: Date:
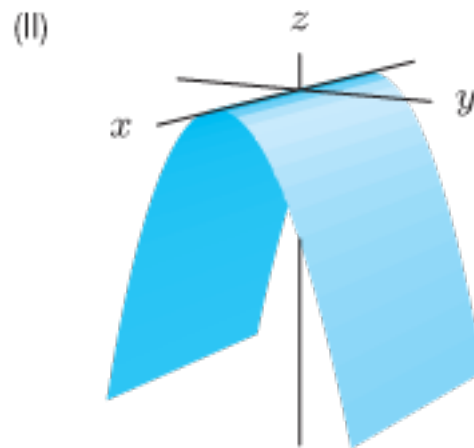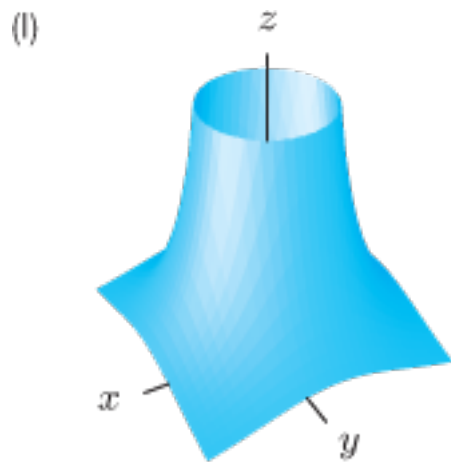
P 2. Match the functions with their graphs below

(a) $z = 2 + x^2 + y^2$

(b) $z = 2 - x^2 - y^2$

(c) $z = 2(x^2 + y^2)$

(d) $z = 2 + 2x - y$

(e) $z = 2$

P 3. Match the functions with their graphs below

(I)

z

x

y

(II)

z

x

y

(III)

z

y

x

(IV)

z

y

x

(V)

z

x

y

(a) $z = \dfrac{1}{x^2 + y^2}$

(b) $z = -e^{-x^2 - y^2}$

(c) $z = x + 2y + 3$

(d) $z = -y^2$

(e) $z = x^3 - \sin y$

P 16. Find an equation for the sphere of radius 3 centered at $(0, \sqrt{7}, 0)$.

P 17. Find an equation for the paraboloid obtained by moving the surface $z = x^2 + y^2$ so that its vertex is at $(1, 3, 5)$, its axis is parallel to the x-axis, and the surface opens towards negative x values.

P 18. Suppose the concentration, C, in mg per liter, of a drug in the blood is a function of x, the amount, in mg, of the drug given and t, the time in hours since the injection. For $0 \leq x \leq 4$ and $t \geq 0$, we have $C = f(x, t) = te^{-t(5-x)}$. Graph $f(a, t)$ for $a = 1, 2, 3, 4$ on the same axes. Describe how the graph changes as a increases and explain what this means in terms of drug concentration.

P 19. Match (a)-(i) with the graphs (I)-(IX).

(a) $z = xye^{-(x^2+y^2)}$

(b) $z = \cos\sqrt{x^2 + y^2}$

(c) $z = \sin y$

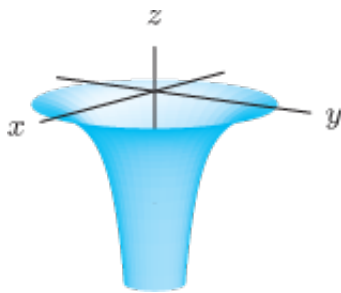(d) $z = -\dfrac{1}{x^2 + y^2}$

(e) $z = \cos^2 x \cos^2 y$
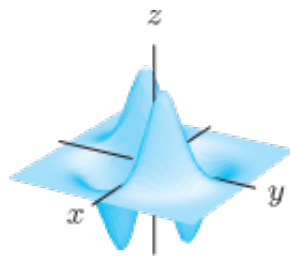
(f) $z = \dfrac{\sin(x^2 + y^2)}{x^2 + y^2}$
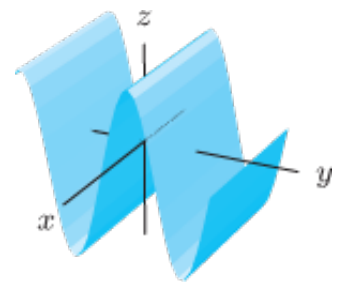
(g) $z = \cos(xy)$

(h) $z = |x||y|$

(i) $z = (2x^2 + y^2)e^{1-x^2-y^2}$
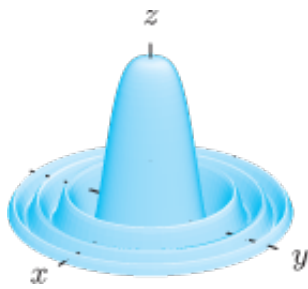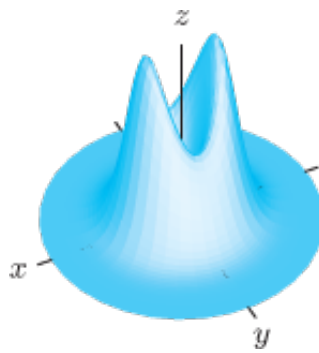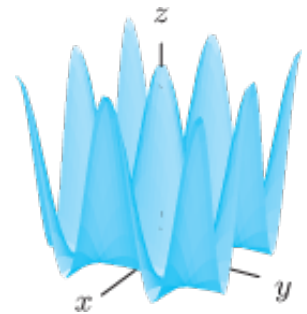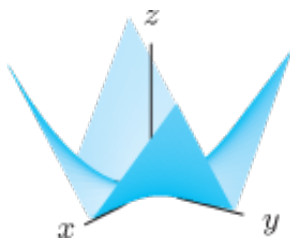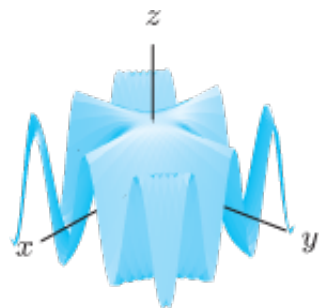
(I)

(IV)

(VII)

(II)

(V)

(VIII)

(III)

(VI)

(IX)