
1.(1 pt)

Match the surfaces with the verbal description of the level curves by placing the letter of the verbal description to the left of the number of the surface.

- 1. $z = \sqrt{(x^2 + y^2)}$
- 2. $z = 2x + 3y$
- 3. $z = \frac{1}{x-1}$
- 4. $z = 2x^2 + 3y^2$
- 5. $z = xy$
- 6. $z = \sqrt{(25 - x^2 - y^2)}$
- 7. $z = x^2 + y^2$

- A. a collection of unequally spaced parallel lines
- B. two straight lines and a collection of hyperbolas
- C. a collection of equally spaced concentric circles
- D. a collection of concentric ellipses
- E. a collection of equally spaced parallel lines
- F. a collection of unequally spaced concentric circles

2.(1 pt)

Match the functions with the verbal description of the level surfaces by placing the letter of the verbal description to the left of the number of the function.

- 1. $w = \sqrt{(x^2 + y^2 + z^2)}$
- 2. $w = x + 2y + 3z$
- 3. $w = x^2 + y^2 + z^2$
- 4. $w = x^2 - y^2 - z^2$
- 5. $w = x^2 + 2y^2 + 3z^2$
- 6. $w = \sqrt{(x + 2y + 3z)}$
- 7. $w = \sqrt{(x^2 + 2y^2 + 3z^2)}$

- A. a collection of equally spaced concentric spheres
- B. a collection of unequally spaced concentric spheres
- C. two cones and two collections of hyperboloids
- D. a collection of concentric ellipsoids
- E. a collection of equally spaced parallel planes

F. a collection of unequally spaced parallel planes

3.(1 pt)

Each of the following functions has a set on which it is continuous and that set has a boundary. Match the verbal description of this boundary with the function by putting the letter of the boundary to the left of the letter of the function.

- 1. $f(x, y) = e^{\frac{1}{x-y}}$
- 2. $f(x, y, z) = \frac{1}{x^2 + y^2 + z^2}$
- 3. $f(x, y, z) = \frac{xyz}{x^2 + y^2 - z}$
- 4. $f(x, y) = \frac{1}{4 - x^2 - y^2}$
- 5. $f(x, y, z) = \frac{z}{1 - x^2 - y^2}$

- A. a circular cylinder
- B. a straight line
- C. a circle
- D. one point
- E. a circular paraboloid

4.(1 pt)

The level curves of a function $f(x, y)$ consist of a collection of hyperbolas and two lines. If the lines intersect at a point P, what are the possibilities for P? Type the letters of all possibilities, with no punctuation, in alphabetical order.

- A. P is a local maximum, that is, $f(P) \geq f(Q)$ for all Q near P.
- B. P is a local minimum, that is, $f(P) \leq f(Q)$ for all Q near P.
- C. P is neither a local maximum nor a local minimum.

5.(1 pt)

On a map showing the grave of George Mallory, the contour lines are:

- A. far apart
- B. closely spaced