

Classroom Voting Questions: Multivariable Calculus

12.5 Functions of Three Variables

1. Level surfaces of the function $f(x, y, z) = \sqrt{x^2 + y^2}$ are
 - (a) Circles centered at the origin
 - (b) Spheres centered at the origin
 - (c) Cylinders centered around the z -axis
 - (d) Upper-hemispheres centered at the origin

2. Any level surface of a function of 3 variables can be thought of as a surface in 3 space.
 - (a) True, and I am very confident
 - (b) True, but I am not very confident
 - (c) False, but I am not very confident
 - (d) False, and I am very confident

3. Any surface that is a graph of a 2-variable function $z = f(x, y)$ can be thought of as a level surface of a function of 3 variables.
 - (a) True, and I am very confident
 - (b) True, but I am not very confident
 - (c) False, but I am not very confident
 - (d) False, and I am very confident

4. Any level surface of a function of 3 variables can be thought of as the graph of a function $z = f(x, y)$.
 - (a) True, and I am very confident
 - (b) True, but I am not very confident
 - (c) False, but I am not very confident
 - (d) False, and I am very confident

5. Suppose the temperature at time t at the point (x, y) is given by the function $T(x, y, t) = 5t - x^2 - y^2$. Which of the following will not cause temperature to decrease?
- (a) moving away from the origin in the positive x direction
 - (b) moving away from the origin in the positive y direction
 - (c) moving away from the origin in the direction of the line $y = x$
 - (d) standing still and letting time pass
6. If temperature at the point (x, y, z) is given by $T(x, y, z) = \cos(z - x^2 - y^2)$, the level surfaces look like:
- (a) spheres
 - (b) Pringles brand potato chips
 - (c) planes
 - (d) bowls
7. The level surfaces of the function $f(x, y, z) = x^2 + y^2 + z^2$ are cylinders with axis along the y -axis.
- (a) True, and I am very confident
 - (b) True, but I am not very confident
 - (c) False, but I am not very confident
 - (d) False, and I am very confident