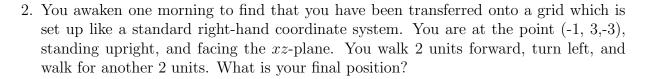# Classroom Voting Questions: Multivariable Calculus

## 12.1 Functions of Two Variables

1. A function $f(x, y)$ can be an increasing function of $x$ with $y$ held fixed, and be a decreasing function of $y$ with $x$ held fixed.

   (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

2. You awaken one morning to find that you have been transferred onto a grid which is set up like a standard right-hand coordinate system. You are at the point (-1, 3,-3), standing upright, and facing the $xz$-plane. You walk 2 units forward, turn left, and walk for another 2 units. What is your final position?

   (a) (-1,1,-1)
   (b) (-3,1,-3)
   (c) (-3,5,-3)
   (d) (1,1,-3)

3. Starting at the origin, if you move 3 units in the positive $y$-direction, 4 units in the negative $x$-direction, and 2 units in the positive $z$-direction, you are at:

   (a) (3,4,2)
   (b) (3,-4,2)
   (c) (4,3,2)
   (d) (-4,3,2)

4. Which of the following points lies closest to the $xy$-plane?

   (a) (3,0,3)
   (b) (0,4,2)
   (c) (2,4,1)

(d) (2,3,4)

5. Which of the following points lies closest to the origin?

   (a) (3,0,3)
   (b) (0,4,2)
   (c) (2,4,1)
   (d) (2,3,4)

6. Which of the following points lies closest to the $y$-axis?

   (a) (3,0,3)
   (b) (0,4,2)
   (c) (2,4,1)
   (d) (2,3,4)

7. The point (2,1,3) is closest to:

   (a) the $xy$ plane
   (b) the $xz$ plane
   (c) the $yz$ plane
   (d) the plane $z=6$

8. Which of the following points lies closest to the point (1,2,3)?

   (a) (3,0,3)
   (b) (0,4,2)
   (c) (2,4,1)
   (d) (2,3,4)

9. Sphere A is centered at the origin and the point (0,0,3) lies on it. Sphere B is given by the equation $x^2 + y^2 + z^2 = 3$. Which of the following is true?

   (a) A encloses B
   (b) A and B are equal
   (c) B encloses A

(d) none of the above

10. The points (1,0,1) and (0,-1,1) are the same distance from the origin.

   (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

11. The point (2, -1, 3) lies on the graph of the sphere $(x - 2)^2 + (y + 1)^2 + (z - 3)^2 = 25$ .

   (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

12. In a table of values for a linear function, the columns must have the same slope as the rows.

   (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

13. The set of all points whose distance from the $z$-axis is 4 is the:

   (a) sphere of radius 4 centered on the $z$-axis
   (b) line parallel to the $z$-axis 4 units away from the origin
   (c) cylinder of radius 4 centered on the $z$-axis
   (d) plane $z = 4$