Check your understanding

19. Is the surface $x^2 + 4xy + 3yz + z^2 = 0$ some kind of cone (a union of lines through the origin)?

    (a) Yes.

    (b) No.

Answer: (a)

Explanation: Since all terms in the equation are quadratic, the solution set is invariant under scaling, i.e. if (x, y, z) is a solution and c is a scalar then (cx, cy, cz) is also a solution. This means that it is a cone. (Because it contains xy and yz terms, it will be rotated from the standard form.)