1. Find the equation of the sphere which has the line segment joining (-1, 6, 4) and (3, 2, -4) as a diameter.

2. Use the distance formula to find an equation corresponding to the point (x, y, z) which are equidistant (i.e., have the same distance) from (2, -3, 5) and (4, -3, 1). Simplify as much as possible.

3. Given points A = (1, 2, 5), B = (3, 6, 1), C = (4, 3, -1) find the point D so that the line segment connecting A and B has the same midpoint as the line segment connecting C and D.

4. You are driving a boat across a river 100 meters wide, heading east at 4 m/s. By the time you reach the other side of the river the current has pushed you south 75 meters. What is the speed of the current? What is a unit vector in the resulting direction of motion?