1. (4 points) Find an inequality that describes the region that contains points outside the closed sphere of radius 3 centered at (3,2,4). Note, the points on the boundary of the sphere should not be included.

- 2. (a) (2 points) Let P = (1, 2, 1) and Q = (2, 2, 2). Compute  $\overrightarrow{PQ}$ 
  - (b) (2 points) Let  $\mathbf{a} = \hat{i} + 2\hat{j}$  and  $\mathbf{b} = \hat{j} + \hat{k}$ . Compute  $\mathbf{a} \cdot \mathbf{b}$ .
  - (c) (2 points) Is your solution to part (b) a vector  $(\mathbb{R}^3)$  or a scalar  $(\mathbb{R})$ ?