

Problem 1.

$$(x - 3)^2 + (y - 2)^2 + (z - 4)^2 > 9$$

Problem 2.

(a)

$$\overrightarrow{PQ} = Q - P = (2, 2, 2) - (1, 2, 1) = (1, 0, 1)$$

(b)

$$\mathbf{a} \cdot \mathbf{b} = (1, 2, 0) \cdot (0, 1, 1) = 1 \cdot 0 + 2 \cdot 1 + 0 \cdot 1 = 2$$

(c) The dot product is a scalar ($\mathbb{R}$).