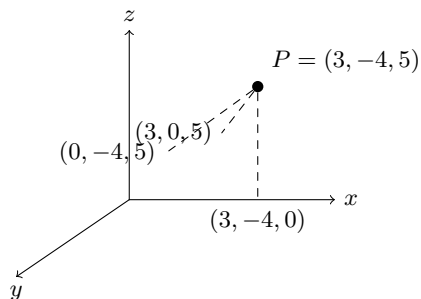


Question 1

A point is $P = (3, -4, 5)$. Find its perpendicular distances to each coordinate plane and to each coordinate axis. Identify the closest plane and the closest axis.

Question 1 – Solution

Strategy A coordinate plane is reached by changing one coordinate to zero. For an axis, two coordinates must become zero, so the distance comes from those two perpendicular components.



Coordinate planes The distances to the yz -, xz -, and xy -planes are $|3| = 3$, $|-4| = 4$, and $|5| = 5$, respectively. Thus the closest plane is the yz -plane.

Coordinate axes For the x -axis, $d = \sqrt{(-4)^2 + 5^2} = \sqrt{41}$. Similarly,

$$d(P, y\text{-axis}) = \sqrt{3^2 + 5^2} = \sqrt{34}, \quad d(P, z\text{-axis}) = \sqrt{3^2 + (-4)^2} = 5.$$

Hence the closest axis is the z -axis, at distance $\boxed{5}$.

Verification Each plane distance uses exactly the omitted coordinate; each axis distance uses exactly the other two coordinates.