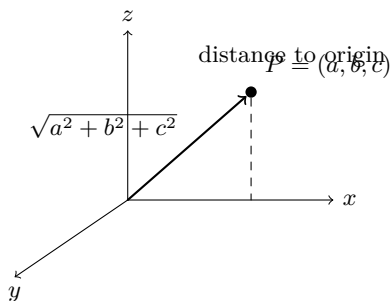


Question 7

A point $P = (a, b, c)$ is 7 units from the origin. Its distances to the yz - and xz -planes are 2 and 3, respectively, and P lies in the octant $x < 0, y > 0, z < 0$. Find P .

Question 7 – Solution

Strategy Distances to the yz - and xz -planes determine $|a|$ and $|b|$. The octant fixes signs, and the distance to the origin determines c .



Known coordinates We have $|a| = 2$ and $|b| = 3$, so $a = -2$ and $b = 3$.

Use the radial distance Since $a^2 + b^2 + c^2 = 49$,

$$4 + 9 + c^2 = 49 \implies c^2 = 36.$$

The octant condition $z < 0$ selects $c = -6$. Hence $\boxed{P = (-2, 3, -6)}$.

Verification Its distance from the origin is $\sqrt{4 + 9 + 36} = 7$, and its plane distances are 2 and 3 as required.