

Show all work. Incomplete answers may receive little or no credit. All numerical answers should be exact, with no decimal approximations.

1. (a) Draw a picture to clearly show the point $(2,5,7)$ in xyz -space.

(b) Draw a picture to clearly show the surface $y = 4$ in \mathbb{R}^3 .

2. Consider the point $P(-6, 5, 2)$.

(a) Find the distance of P from the origin.

(b) How far is P from the xz -plane?

(c) Write down the equation of a sphere with center P which just touches the xz -plane at one point.

(d) Describe in words and give the equation of the intersection of that sphere with the xy -plane.