

8. Find the equation of the sphere whose center is $(3, 5, 4)$ and which is tangent to the yz -plane.

The sphere touches the yz -plane at $(0, 5, 4)$, so the radius of the sphere is 3.

The sphere is $(x-3)^2 + (y-5)^2 + (z-4)^2 = 9$

9. Find the work done by the force $\vec{F} = 2\vec{i} - 5\vec{j} + 6\vec{k}$ as it moves an object in a straight line from $P = (3, 2, 4)$ to $Q = (9, 4, 6)$. Force is measured in pounds. Distance is measured in feet.

$$W = \vec{F} \cdot \vec{PQ} = \langle 2, -5, 6 \rangle \cdot \langle 6, 2, 2 \rangle = 12 - 10 + 12 \text{ foot-pounds}$$

10. Find the distance from the point $(4, 5, 6)$ to the x -axis.

The point on the x -axis which is closest to $(4, 5, 6)$ is $(4, 0, 0)$. The distance from $(4, 0, 0)$ to $(4, 5, 6)$ is

$$\sqrt{25 + 36}$$