

## Answer on Question #79920 – Math – Analytic Geometry

### Question

Find the radius and the center of the circular section of the sphere  $|r| = 26$  cut off by the plane

$$r \cdot (2i + 6j + 3k) = 70$$

### Solution

Let

$$\vec{n} = (2, 6, 3)$$

$$r_0 = 26$$

$$c_0 = 70$$

Then

$$\langle r, \vec{n} \rangle = \langle \lambda \vec{n}, \vec{n} \rangle = c_0$$

$$\lambda = \frac{c_0}{|\vec{n}|^2}$$

$$|\vec{n}|^2 = 4 + 36 + 9 = 49$$

$$\lambda = \frac{70}{49} = \frac{10}{7}$$

The center of the circular section

$$p_c = \frac{c_0}{|\vec{n}|^2} \vec{n} = \frac{10}{7} \cdot (2, 6, 3) = \left( \frac{20}{7}, \frac{60}{7}, \frac{30}{7} \right)$$

The radius of the circular section

$$r_c = \sqrt{|p_c|(r_0 - |p_c|)}$$

$$|p_c| = \frac{c_0}{|\vec{n}|} = \frac{70}{7} = 10$$

$$r_c = \sqrt{10 \cdot (26 - 10)} = \sqrt{160} = 4\sqrt{10}$$

Answer provided by <https://www.AssignmentExpert.com>