

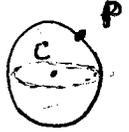
Quiz #5

Name: answer key

- [6] 1. Find the equation of the sphere whose center is at $C(2, 1, -1)$ and which contains the point $P(5, 5, 1)$.

$$r = |\vec{CP}| = \sqrt{(5-2)^2 + (5-1)^2 + (1-(-1))^2}$$

$$= \sqrt{9 + 16 + 4} = \sqrt{29} \quad (2)$$



$$(x-2)^2 + (y-1)^2 + (z-(-1))^2 = (\sqrt{29})^2 \quad (2)$$

$$(x-2)^2 + (y-1)^2 + (z+1)^2 = 29$$

- [6] 2. Find the center and radius of the sphere whose equation is $x^2 + y^2 + z^2 = 6x - 8z$.

$$x^2 - 6x + y^2 + z^2 + 8z = 0$$

$$x^2 - 6x + 9 + y^2 + z^2 + 8z + 16 = 25 \quad (2)$$

$$(x-3)^2 + y^2 + (z+4)^2 = 5^2 \quad (1)$$

The center is $(3, 0, -4)$ and the radius is 5.
(2) (1)

3. In the diagram $\mathbf{a} = \langle 5, 2 \rangle$ and $\mathbf{b} = \langle 1, 6 \rangle$. Find the components of the following vectors:

(2) a. $\vec{RQ} = \vec{b} - \vec{a} = \langle 1, 6 \rangle - \langle 5, 2 \rangle$
 $= \langle -4, 4 \rangle$

(3) b. $\vec{PT} = 2\vec{a} + \vec{b} = 2\langle 5, 2 \rangle + \langle 1, 6 \rangle$
 $= \langle 10, 4 \rangle + \langle 1, 6 \rangle$
 $= \langle 11, 10 \rangle$

(3) c. \vec{QS}
 $= 2\vec{a} - \vec{b} = 2\langle 5, 2 \rangle - \langle 1, 6 \rangle$
 $= \langle 10, 4 \rangle - \langle 1, 6 \rangle$
 $= \langle 9, -2 \rangle$

