Quiz 5 A good day starts with a quiz!   Winston Churchill

First Name: _Lily_   Last Name _Wave_

Problem 1 (5 points): Find the angle between the two vectors $\langle 3, 4, 5\rangle$ and $\langle 2, 3, 7\rangle$.

$$\theta = \cos^{-1}\left(\frac{u \cdot v}{|u||v|}\right)$$

$u \cdot v = 6 + 12 + 35 = 53$

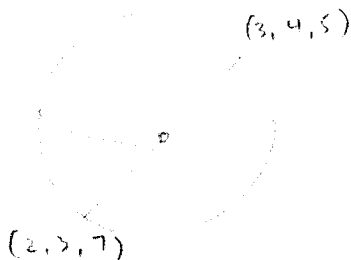$|u| = \sqrt{3^2 + 4^2 + 5^2} = \sqrt{9 + 16 + 25} = \sqrt{50}$

$|v| = \sqrt{2^2 + 3^2 + 7^2} = \sqrt{4 + 9 + 49} = \sqrt{62}$

$$\theta = \cos^{-1}\left(\frac{53}{\sqrt{50}\sqrt{62}}\right) = \cos^{-1}\left(\frac{53}{\sqrt{3100}}\right)$$

$$= \cos^{-1}\left(\frac{53}{10\sqrt{31}}\right)$$

3100

Problem 2 (5 points): Find the equation of the sphere if one of its diameters has endpoints $(3, 4, 5)$ and $(2, 3, 7)$.

$(3, 4, 5)$

$(2, 3, 7)$

$$\text{center} = \left(\frac{5}{2}, \frac{7}{2}, \frac{12}{2}\right)$$

$$\left(x - \frac{5}{2}\right)^2 + \left(y - \frac{7}{2}\right)^2 + (z - 6)^2 = r^2$$

$$\left(3 - \frac{5}{2}\right)^2 + \left(4 - \frac{7}{2}\right)^2 + (5 - 6)^2 = r^2$$

$$\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2 + (-1)^2 = r^2$$

$$\frac{1}{4} + \frac{1}{4} + 1 = r^2$$

$$r = \sqrt{\frac{3}{2}}$$

$$\left(x - \frac{5}{2}\right)^2 + \left(y - \frac{7}{2}\right)^2 + (z - 6)^2 = \frac{3}{2}$$