Lindsey Wingate

Calculus III ⇒ Math 265

Test #1 ⇒ 75 Points Name:

#1) Find the radius and the center of the sphere (4pts)

$x^2 + y^2 + z^2 + 4x - 10y + 8z - 4 = 0$

$(x^2+4x+4)(y^2-10y+25)(z^2+8z+16) = 4$

$4(\frac{1}{2}) = 2^2 \quad (-10)\frac{1}{2} = 5^2 \quad 8\frac{1}{2} = 4^2$

$+4+25+16$

49

Radius = 7

	x	2
x	x^2	$2x$
2	$2x$	4

	y	-5
y	y^2	$-5y$
-5	$-5y$	25

	z	4
z	z^2	$4z$
4	$4z$	16

$\boxed{(x+2)^2 (y-5)^2 (z+4)^2 = 49}$

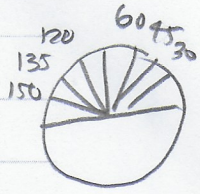
$\boxed{\begin{array}{l}\text{Radius} = 7 \\ \text{center} = (-2, 5, -4)\end{array}}$

#2) If $\vec{v}\ (2, 60°)$ and $\vec{w}\ (-1, 135°)$, find $\vec{v} + \vec{w}$ (5pts) in polar form.

① rect. form

$v = \langle x = 2\cos 60° = 1,\ y = 2\sin 60° = 2\frac{\sqrt{3}}{2} = \sqrt{3} \rangle \quad v = \langle 1, \sqrt{3} \rangle$

$w \langle x = -1\cos 135 = +\frac{\sqrt{2}}{2},\ y = -1\sin 135 = -\frac{\sqrt{2}}{2} \rangle \quad w = \langle \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \rangle$



$\langle 1 + \frac{\sqrt{2}}{2}, \sqrt{3} + -\frac{\sqrt{2}}{2} \rangle$

$\frac{2}{2} + \frac{\sqrt{2}}{2} = \langle \frac{2+\sqrt{2}}{2}, \sqrt{3} + -\frac{\sqrt{2}}{2} \rangle \Rightarrow \langle 1.707106781, 1.024944026 \rangle$

$\sqrt{3.964723818}$

$\theta = \tan^{-1}(y/x)$ $\boxed{\theta = 310}$

$r = \sqrt{x^2+y^2}$ $r = 1.991161424$

or

$\boxed{r = 2}$

$\boxed{\langle 2, 310 \rangle}$

$\vec{v} + \vec{w} =$