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 8am Section  
 Sample Homework Set

$(x-1)^2 + (y-2)^2 + (z-3)^2 = 1$   
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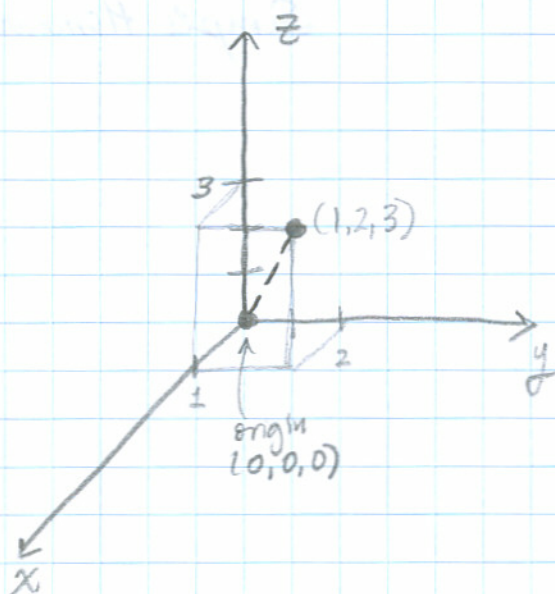
The equation of the sphere is  
 $(x-1)^2 + (y-2)^2 + (z-3)^2 = 1$   
 $(x-1)^2 + (y-2)^2 + (z-3)^2 = 1$

The general equation of a sphere is  
 $(x-h)^2 + (y-k)^2 + (z-l)^2 = r^2$

where  $(h, k, l)$  is the center of the sphere  
 and  $r$  is the radius.

Section 9.1, #12

Problem: Find an equation of the sphere that passes through the origin and whose center is  $(1, 2, 3)$ .



Solution:

Since the sphere is centered at  $(1, 2, 3)$  and passes through  $(0, 0, 0)$  the length of the radius,  $r$ , of the sphere is

$$\begin{aligned} r &= \text{dist from } (1, 2, 3) \text{ to } (0, 0, 0) \\ &= \sqrt{(1-0)^2 + (2-0)^2 + (3-0)^2} \\ &= \sqrt{14} \end{aligned}$$

The equation of the sphere is then

$$\begin{aligned} (x-1)^2 + (y-2)^2 + (z-3)^2 &= (\sqrt{14})^2 \\ &= 14 \end{aligned}$$

since the general equation of a sphere is

$$(x-h)^2 + (y-k)^2 + (z-j)^2 = r^2$$

where  $(h, k, j)$  is the center of the sphere and  $r$  is its radius.

Section 9.2 - # 11

Problem: Find the sum of the given vectors and illustrate geometrically.

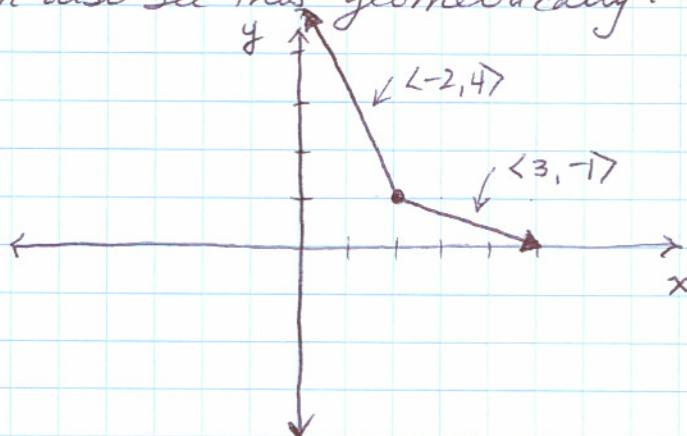
$$\langle 3, -1 \rangle \text{ and } \langle -2, 4 \rangle$$

Solution:

algebraically, the sum is

$$\begin{aligned} \langle 3, -1 \rangle + \langle -2, 4 \rangle &= \langle 3-2, -1+4 \rangle \\ &= \langle 1, 3 \rangle \end{aligned}$$

we can also see this geometrically:



to add the vectors place the tail of one at the head of the other and find the resultant vector:

