Calculus 3 – Aug 27, 2003

Take out a 8 1/2 by 11 piece of paper
Write your name and today's date on it
Rules:
Show ALL work for credit; be neat. Calculators can be used for graphing and calculating only. Give exact answers when possible.

Problem

Find the center and radius of the sphere

$$x^2 + y^2 + z^2 + 2x + 8y - 4z = 28$$

Solution

1

2

3

Complete the square

$x^2+2x+?_x+y^2+8y+?_y+z^2-4z+?_z = 28+?_x+?_y+?_z$

$(x+1)^2+(y+4)^2+(z-2)^2 = 28+1^2+4^2+2^2 =$

$28+1+16+4 = 49$

$(x+1)^2+(y+4)^2+(z-2)^2 = 7^2$

Thus the radius is 7 and the center is $(-1,-4,2)$**.**

$(x-(-1))^2+(y-(-4))^2+(z-2)^2 = 7^2$

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