Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. | Make your work correct, complete and coherent. |

Please take a picture of your quiz (for your records) just before you turn the quiz in. I will e-mail your grade and my comments to you. I will return your quiz when I next see you.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 1, January 15, 2025

Find the center and radius of the sphere $2x^2 + 2y^2 + 2z^2 + x + y + z = 9.$

Answer:

We better complete the square:

$$2\left(x^2 + \tfrac{1}{2}x + \boxed{\tfrac{1}{16}}\right) + 2\left(y^2 + \tfrac{1}{2}y + \boxed{\tfrac{1}{16}}\right) + 2\left(z^2 + \tfrac{1}{2}z + \boxed{\tfrac{1}{16}}\right) = 9 + 2\boxed{\tfrac{1}{16}} + 2\boxed{\tfrac{1}{16}} + 2\boxed{\tfrac{1}{16}}$$

So,

$$2\left(x + \tfrac{1}{4}\right)^2 + 2\left(y + \tfrac{1}{4}\right)^2 + 2\left(z + \tfrac{1}{4}\right)^2 = 9 + \tfrac{3}{8}$$
$$\left(x + \tfrac{1}{4}\right)^2 + \left(y + \tfrac{1}{4}\right)^2 + \left(z + \tfrac{1}{4}\right)^2 = \tfrac{75}{16}.$$

$$\boxed{\text{The center is } \left(-\tfrac{1}{4}, -\tfrac{1}{4}, -\tfrac{1}{4}\right). \text{ The radius is } \frac{\sqrt{75}}{4}.}$$