TPHS Linear Algebra — SDSU Math 254 Name: _____

Quiz #3 (4.1 - 4.3) _____ Per.: _____

Scientific calculator allowed. 15 pts.

Clearly show *all* work. Simplify and circle your answers. (5 points per problem)

1) Given the following linear transformations, fill in the domain and the codomain.

$$T_1 \Rightarrow \begin{aligned} w_1 &= 3x_1 - 2x_2 + 4x_3 \\ w_2 &= 5x_1 - 8x_2 + x_3 \end{aligned}$$

$$T_2 \Rightarrow \begin{aligned} w_1 &= 7x_1 + 2x_2 - 8x_3 \\ w_2 &= -x_2 + 5x_3 \\ w_3 &= 4x_1 + 7x_2 - x_3 \end{aligned}$$

T_1: _____ $\rightarrow$ _____

T_2: _____ $\rightarrow$ _____

Write the standard matrix for

$T_3 = T_1 \circ T_2$

Also, T_3: _____ $\rightarrow$ _____

2) Find the standard matrix for the stated composition.

In $\mathbb{R}^2$, a reflection about the x-axis followed by a rotation of 30° followed by a dilation with factor $k = 2$.

-Continued-

3) There are two properties that must be true for T: $\mathbb{R}^n \to \mathbb{R}^m$ to be a *linear transformation*.

Use these two properties to verify or disprove that the following transformation is linear. Be sure to clearly show your work and state your conclusion.

$$T(x, y, z) = (\ y,\ \ x,\ \ x\ )$$