The differential equations that model the suspension system shown below for displacement input \( u(t) \) can be shown to be the following:

\[
\ddot{z} + 3\dot{z} + 100z = 3\dot{v} + 100v \\
\dot{v} + 100\dot{v} + 3000v = 60\ddot{z} + 2000z + 40\dot{u} + 1000u
\]

To express these equations in state variable format, four state variables are needed. The first two are \( x_1 = z \) and \( x_2 = \dot{z} \). What are \( x_3 \) and \( x_4 \)?

\[
x_3 = v \\
x_4 = \dot{v} - 40u
\]

If the output of interest is \( y = v - z \), complete the following equations:

\[
x_1 = x_2 \\
x_2 = 3\dot{v} + 100u - 100z - 3\ddot{z} = 3x_1 + 100x_3 - 100x_1 - 3x_2 \\
x_3 = x_4 + 40u \\
x_4 = 60\ddot{z} + 2000z + 40\dot{u} + 1000u - 100\dot{v} + 3000v = 60x_2 + 2000x_3 + 40\dot{u} + 1000u - 100x_1 - 3000x_1 + 3000v \\
y = x_2 - x_1
\]