

Water:

$$\text{ENERGY} = \text{MASS} \times \text{SPECIFIC HEAT} \times \text{TEMPERATURE CHANGE}$$

$$\text{ENERGY} = \underline{50.0 \text{ g}} \times 4.184 \frac{\text{J}}{\text{g}^\circ\text{C}} \times \underline{6.7^\circ\text{C}} \quad (28.9^\circ\text{C} - 22.2^\circ\text{C})$$

$$= 1401.64 \text{ J}$$

This number has two significant figures, but we'll wait until the final answer to round!

By conservation of energy, this energy gained by the water is also equal to the energy LOST by the zinc!

Zinc:

$$\text{SPECIFIC HEAT} = \frac{\text{ENERGY}}{\text{MASS} \times \text{TEMPERATURE CHANGE}}$$

$$\text{SPECIFIC HEAT} = \frac{\underline{1401.64 \text{ J}}}{\underline{50.2871 \text{ g}} \times \underline{70.8^\circ\text{C}}}$$

$$= \underline{0.39 \text{ J/g}^\circ\text{C}}$$

The temp change of the metal is different from the temp change of the water!

$$\begin{array}{r} 99.7^\circ\text{C} \\ - 28.9^\circ\text{C} \\ \hline 70.8^\circ\text{C} \end{array}$$

$$0.3936824752 \text{ J/g}^\circ\text{C}$$