Transformations Quiz

CMSC320

Consider data for variable $\mathbf{x} = x_1, x_2, \ldots, x_n$. We use $\overline{x}$ to denote the sample mean of $\mathbf{x}$, and s_x is the sample standard deviation of $\mathbf{x}$.

For each of the following three transformations derive (a) the sample mean $\overline{z}$, and (b) the sample standard deviation s_z.

1. Centering

$$z_i = (x_i - \overline{x})$$

2. Scaling

$$z_i = \frac{x_i}{s_x}$$

3. Centering and scaling (standardizing)

$$z_i = \frac{(x_i - \overline{x})}{s_x}$$