1(a) $\left(\text{softmax}\left(\mathbf{x}+c\right)\right)_i$

$$= \frac{\exp\left(x_i+c\right)}{\sum_j \exp\left(x_j+c\right)} \tag{1}$$

$$= \frac{\exp\left(c\right)\exp\left(x_i\right)}{\exp\left(c\right)\sum_j \exp\left(x_j\right)} \tag{2}$$

$$= \frac{\exp\left(x_i\right)}{\sum_j \exp\left(x_j\right)} \tag{3}$$

$$= \left(\text{softmax}\left(\mathbf{x}\right)\right)_i \tag{4}$$