You might find the environments `bmatrix` and `pmatrix` useful for the following exercises.

$$\rho_\theta = \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix} = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} \tag{21}$$

$$\left[\begin{array}{c|ccc} 1 & 0 & \cdots & 0 \\ \hline 0 & * & \cdots & * \\ \vdots & \vdots & \ddots & \vdots \\ 0 & * & \cdots & * \end{array}\right] = \boxed{\begin{array}{c|ccc} 1 & 0 & \cdots & 0 \\ \hline 0 & * & \cdots & * \\ \vdots & \vdots & \ddots & \vdots \\ 0 & * & \cdots & * \end{array}} \tag{22}$$

Note the locations of the bounds on the summation in the following exercise.

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N} p_i(x_i - \bar{x})^2} = \sqrt{\frac{\sum\limits_{i=1}^{N} p_i(x_i - \bar{x})^2}{N}} \tag{23}$$