Exercise-1.1: MSE (Mean Squared Error) function, in this case: $E(w) = \frac{1}{2}\sum_{n=1}^{N}\{y(x_n, w) - t_n\}^2$ is a convex function. Meaning there is only one minima point. We want to find its coordinates for a specific value of w_i we can find that value by $\frac{\delta}{\delta w_i}E(w) = 0$.

$$\frac{1}{2}\frac{\delta}{\delta w_i}\sum_{n=1}^{N}\{y(x_n, w) - t_n\}^2 = \frac{1}{2} * 2 * \sum_{n=1}^{N}\{(y(x_n, w) - t_n) * \frac{\delta}{\delta w_i}(y(x_n, w) - t_n)\}$$

Then

$$\sum_{n=1}^{N}\{(y(x_n, w) - t_n) * x^i\} = \sum_{n=1}^{N}\{\sum_{j=0}^{M}\{w_j x_n^j\} - t_n\}\, x_n^i\}$$
$$= \sum_{n=1}^{N}\sum_{j=0}^{M}\{w_j x_n^{j+i}\} - \sum_{n=1}^{N}\{t_n x_n^i\} = 0$$

Continues as

$$\sum_{n=1}^{N}\sum_{j=0}^{M}\{w_j x_n^{j+i}\} = \sum_{n=1}^{N}\{t_n x_n^i\}$$

Which is

$$\sum_{j=0}^{M} A_{ij} w_j = T_i \ consisten\ with\ the\ equations\ of\ A_{ij} and\ T_i\ given\ at\ question.$$