exercise 1:
(i). Show that \( \{(X - 1)(X - 2), X(X - 2), X(X - 1)\} \) is a basis for \( \mathbb{R}_2[X] \).
(ii). Let \( \{a_1, ..., a_n\} \) be a subset of \( \mathbb{R} \) which has exactly \( n \) elements. Set \( Q = \prod_{j=1}^{n}(X - a_j) \),
and for \( i = 1, ..., n \) set \( P_i = Q/(X - a_i) \). Show that \( \{P_1, ..., P_n\} \) is a basis for \( \mathbb{R}_{n-1}[X] \).

exercise 2:
From your textbook: 2.1.4

exercise 3:
From your textbook: 2.1.9: a, b, c.

exercise 4:
From your textbook: 2.1.13

exercise 5:
From your textbook: 2.1.28

exercise 6:
From your textbook: 2.1.31

exercise 7:
From your textbook: 2.2.2: a, e, f.

exercise 8:
From your textbook: 2.2.4