Problem: Let
\[ p = 1 - x^2 \]
\[ q = 2 + 3x - x^2 \]
\[ r = 1 + 3x \]
\[ f = 2 - 2x^2. \]

(a) Find the coordinate vectors of \( p, q, r, f \) relative to the standard basis of \( P_2 \).

(b) Use the information in part (a) to determine (with explanation) whether \( f \) is in the span of \( \{p, q, r\} \).