3. Define "null space".

The null space of the matrix \( A \) is the set of all column vectors \( x \) with \( Ax = 0 \).

4. Define "span". The vectors \( v_1, \ldots, v_p \) in the vector space \( V \) span \( V \) if every vector in \( V \) can be written as a linear combination of \( v_1, \ldots, v_p \).

5. Let \( V \) be the vector space of polynomials \( f(x) \) of degree at most three with \( f(1) = 0 \). Record a basis for \( V \). No justification is needed.

\[
\begin{align*}
x - 1 \\
x^2 - 1 \\
x^3 - 1
\end{align*}
\]