

SECTION 3.2
NUMBER 1

3.2.1

Is the set of all polynomials of degree greater than 3 together with the zero polynomial a subspace of the vector space of all polynomials, P .

Solution

Let's apply the Test for Subspaces (Theorem 3.2). First, let's test for closure under addition... I think it FAILS this!

Consider

$$p(x) = 3x^5 - 2x^4 + 3x^2 + x + 1$$

$$q(x) = -3x^5 + 2x^4,$$

then $p(x) + q(x) = 3x^2 + x + 1$ which is of degree 2 and is NOT in the set. So, by Theorem 3.2, this is

NOT a subspace of P .

□