Answer on Question #44929 – Math - Linear Algebra

Problem.

Let P^3 ={ax^3+bx^2+cx+d ! a,b,c,d ϵ R}. Check whether f (x) = x^2+2x+1 is in[S], the subspace of P^3 generated by S ={3x^2+1, 2x^2+x+1}.

If f (x) is in [S], write f as a linear combination of elements in S.

If f (x) is not in [S], find anotherpolynomial g(x) of degree at most two such that f (x) is in the span of S U {g(x)}.

Alsowrite f as a linear combination of elements in S U {g(x)}.

Solution.

$x^2 + 2x + 1 = 2(2x^2 + x + 1) - (3x^2 + 1)$, so $f(x) \in [S]$.