Mathematical Department 2nd stage Linear Algebra

Q1/ Let S={ x2+1, x-1, 2x+2} be a subset of vector space P2(R) over the field R, Show that S Spans P2(R), [ <S>= P2(R)]. 5 marks

Q2/ Define a subspace of vector space, and prove that if M and M be two subspaces of the vector space V, then M$∩$ N is also subspace of V. 5 marks

Q3/ Define Direct sum of two subspaces in vector space. Let U1= {(x,y) ; y=2x}, and U2={ (x,y) ; y= -3x } be two subspaces in R2, show that R2 = U1 + U2. 5 marks

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Q1/ In R3, U={ (x, y, z) : x2+1, z=x+2y} and W= { (x, y, z) : x= -y} be two vector subspaces over the field R, find dim(U +W) and U+ W. 5 marks

Q2/ Define a coordinate vector. Find the coordinate vector of u= 5x-2 in P1(R) with respect to the basis S= { x+1, x-1}. 5 marks

Q3/ Let T: R2 →R2 defined by T(x, y)=( x+1, x+ y), test whether T is linear transformation or not.

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