Question 1: (12 points) Consider the vectors w1  and w2 in 

Describe the span of the vectors w1 and w2.

Question 2:( 20 points)

For what values of m does the following linear system have

 x + mz = 0

 x + y =1

 x + my -2 z = -1

1. No solution
2. Infinitely many solutions
3. Exactly one solution

Question 3: (23 points)

1. Without using any row or column operations, find det A when

A = 

1. For which value(s) of k is A invertible?
2. For k = 1 , find det (2 A-1 AT) – 1
3. For k = 2 , solve the homogeneous system AX = 0

Question 4:

1. ( 8 points) Suppose that A, B and C are 2 x 2 invertible matrices such that (CB)-1 =  and (BAB)-1 =  find the inverse of
2. (AC – 1 + B -1) – 1 AB is
3. ( 6 points) Find the inverse of I + D for an n x n matrix D satisfying D4 = 0.

Question 5:

 Prove the following statements

1. ( 7 points) If A is invertible then det A 0.
2. ( 6 points) For m x n matrix B and an n x n D diagonal matrix, BTB – 2 D is a symmetric matrix.
3. ( 8 points) Let A0 and B0 be n x n matrices such that A is symmetric and B is skew symmetric. Show that {A, B} is independent.

Question 6: ( 10 points)

Indicate whether each of the statements is true or false. Give a justification when the statement is false.

1. Every non zero diagonal matrix is invertible
2. If A = A– 1 then det A = 1
3. If A and B are invertible then so is A + B
4. The column vectors of any 2 x 3 matrix A are linearly dependent.