Your name:

Instructor (please circle):   Samantha Allen   Angelica Babei

Math 22 Fall 2018 Homework 6, due Fri Oct 26 4:00 pm in homework boxes in front of Kemeny 108   *Please show your work, and check your answers. No credit is given for solutions without work or justification.*

(1) Consider the matrix $A = \begin{bmatrix} 2 & -4 & 8 & 2 \\ -1 & 3 & -3 & 0 \\ 1 & -1 & 5 & 2 \end{bmatrix}$.

(a) Find a basis for $\text{Row}\,A$.

(b) Find the rank of A and the dimension of $\text{Nul}\,A$.

(2) True or false (no working needed, just circle the answer):

    (a) T / F: A coordinate mapping is both one-to-one and onto.

    (b) T / F: If dim $V = 10$, then there exists a spanning set of 11 vectors in V.

    (c) T / F: If the null space of a 5×6 matrix A is 4-dimensional, the dimension of the column space of A is 1.

    (d) T / F: If the rank of a matrix A is equal to the number of columns of A, then A is an invertible matrix.

    (e) T / F: If V is an n-dimensional vector space and S is a subset of V consisting of n vectors, then S is a basis for V.

(3) The set $B = \{1 - t^2, t - t^2, 2 - 2t + t^2\}$ is a basis for $\mathbb{P}_2$, the vector space of polynomials of degree at most 2.

(a) Find the change-of-coordinates matrix from B to the standard basis $C = \{1, t, t^2\}$ for $\mathbb{P}_2$.

(b) Find the coordinate vector of $\mathbf{p}(t) = 3 + t - 6t^2$ relative to B.