Worksheet 8

Sections 306 and 310
MATH 54

September 18, 2018

Exercise 1. Determine the values of s such that the system has a unique solution. Use Cramer's rule to describe the solutions in terms of s.

$$3sx_1 + 5x_2 = 3$$

$$12x_1 + 5sx_2 = 2$$

Exercise 2. Find the area of a parallelogram whose vertices are listed: (0,-2), (5,-3), (-3,1), (2,0).

Exercise 3. Find the area of a triangle whose vertices are $(0, 0)$, (v_1, v_2), (w_1, w_2)

Exercise 4. Determine if the following sets are polynomials are subspaces of the space $\mathbb{P}_3$ of polynomials in t of degree at most 3.

a. All polynomials of the form $a + t^2$, where a is in $\mathbb{R}$.

b. All polynomials p in $\mathbb{P}_3$ such that $p(0) = 0$.

Exercise 5. Let W be the set of all vectors of the form $\begin{bmatrix} 5b + 2c \\ b \\ c \end{bmatrix}$, where b, c can be any real numbers. Find $\mathbf{u}, \mathbf{w}$ such that W is the span of $\mathbf{u}, \mathbf{w}$. Is W a subspace of $\mathbb{R}^3$?

Exercise 6. Find an explicit description of Nul(A) by listing vectors that span the null space:

$$\begin{bmatrix} 1 & 6 & -4 & -3 & 1 \\ 0 & 1 & -2 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

How many entries do vectors in the null space have? How many entries to vectors in the column space have?