Instructions

1. To receive full credit you must explain how you got your answer.

2. While I encourage collaboration, you must write solutions IN YOUR OWN WORDS. DO NOT SHARE COMPLETE SOLUTIONS before they are due. YOU WILL RECEIVE NO CREDIT if you are found to have copied from whatever source or let others copy your solutions.

3. Workshop must be handwritten (electronic handwriting is allowed) for authentication purposes and submitted on Canvas. Late submission will NOT be accepted. It is your responsibility to MAKE SURE THAT YOUR SUBMISSIONS ARE SUCCESSFUL AND YOUR FILES ARE LEGIBLE AND COMPLETE. It is also your responsibility that whoever reads your work will understand and enjoy it. 1 point out of 10 may be taken off if your solutions are hard to read or poorly presented.

Workshop 3

1. Draw the span of the following sets of vectors in $\mathbb{R}^3$.

a. $\{(0,0,0)\}$.
b. $\{(1,1,0)\}$.
c. $\{(1,0,0),(-1,0,0)\}$
d. $\{(1,0,0),(0,0,1)\}$.
e. $\{(1,0,0),(1,0,1)\}$.
f. $\{(1,1,0),(0,0,1),(-1,-1,-1)\}$
g. $\{(1,1,0),(0,0,1),(1,0,1)\}$.

2. Recall that $\mathcal{P}_2$ is the vector space of polynomials of the form $a_0 + a_1x + a_2x^2$, where a_0, a_1, a_2 are real numbers. Describe the span of the following sets of vectors in the simplest possible terms.

a. $\{0\}$.
b. $\{1+x\}$.
c. $\{1,-1\}$.
d. $\{1,x^2\}$.
e. $\{1,1+x^2\}$.
f. $\{1+x,x^2,-1-x-x^2\}$.
g. $\{1+x,x^2,1+x^2\}$.

3. a. In 1, which sets of vectors are linearly dependent and which sets are linearly independent?

b. What do linear dependence and linear independence in $\mathbb{R}^3$ mean geometrically?

c. In 2, which sets of vectors are linearly dependent and which sets are linearly independent?

4. Do you see connections between 1 and 2? Try to describe it. (We will talk more about it soon.)