Math 22A (De Loera)   Homework 4
Due date: Thursday, February 14 2019 at 11:59pm

INSTRUCTIONS

   This homework is worth 5 points. It consists of the WEBWORK problems I
assigned PLUS the problems I wrote below.
   Write legibly but preferably use word processing if your hand-writing is unclear.
If you send a photograph it better be legible and send one photo per problem with
name of problem clearly indicated. Be organized and use the notation appropriately.
Show your work on every problem. Correct answers with no support work will not
receive full credit.

1. AS ALWAYS: Do all WEBWORK problems assigned. This time they are in Strang W05 and W06.
   Finish reading Chapter 3 of Strang.

2. Solve the following problems in Section 3.1 of textbook: (6,7,10,18,27).

3. Solve the following problems in Section 3.2 of textbook: (10,15,24,33).

4. Solve the following problems in Section 3.3 of the textbook: (1,4,10,24,25,34).

5. a) Find a 2×2 matrix A, with entries 0 or 2, such that $A^2 = 0$.

   b) Can you find a 3×3 matrix A with entries -2 or 1 such that $A^2 = 0$? Hint: this is not such a
   large space to search using MATLAB, right?

   c) Can you find a 4×4 matrix with entries -1 or 3 such that $A^2 = 0$?

6. Remember, the rank of A is the number of pivots of the matrix A (read from row reduced echelon
   form). Consider the set X of all 2×2 matrices with matrix entries 1 or 2. The probability of a set
   of matrices Y with some property is the number of matrices in Y divided by the number of matrices
   in X.

   a) What is the probability that the rank of the matrix is 0?

   b) What is the probability that the rank of the matrix is 1?

   c) What is the probability that the rank of the matrix is 2?