All of these problems are from our text by Strang (3rd edition). I believe you will find them both short and routine.

1. *This problems refer to the “row and column” pictures discussed in Strang at the beginning of Chapter 2.*

   a) Draw the row and column pictures in two planes for the equations $x - 2y = 0$, $x + y = 6$.

   b) [Fill in the blanks] For two linear equations in three unknowns $x, y, z$, the row picture will show ____ [lines or planes?] in ____ [2 or 3?] dimensional space. The column picture is in ____ [2 or 3?] dimensional space. The solutions normally lie on a ____.

   c) [Fill in the blanks] For four linear equations in two unknowns $x$ and $y$, the row picture shows four ____. The column picture is in ____-dimensional space. The equations have no solution unless the vector on the right side is a combination of ____.

2. (Strang, p. 34 #33) Run the MATLAB code below for $t = 1$, $t = 0.5$ and $t = 1.5$. It allows you to input $x_0$ with a mouse click, by `ginput`. With $t = 1$, the following matrix $A$ rotates vectors by $\theta$. The plot will show $Ax_0$, $A^2x_0$, ... going around a circle. ($t > 1$ will spiral out and $t < 1$ will spiral in). You can change $\theta$ and the stop at $j = 10$.

   ```matlab
   theta = 15*pi/180; t = 1.0;
   A = t*[cos(theta) - sin(theta) ; sin(theta) cos(theta)];
   disp('Click to select starting point')
   [x1, x2] = ginput(1); x = [x1; x2];
   for j = 1:10
       x = [x A*x(:, end)];
   end
   plot(x(1,:), x(2,:), 'o')
   hold off
   ```

   How should you modify this so that the rotation is in the opposite direction?
3. Strang, p. 43 #11, #12, #13, and #14. [All of these are short].

4. Strang p. 44 #21 - #22.


7. Strang p. 65 #5 and #6.

8. Strang p. 66 #11.


10. Strang p. 69 #30.

11. Strang p. 70 #33 and #34.

12. Strang p. 79 #5 and #6.


15. Strang p. 82 #41.