**Exercises from Strang**   P.42 9,10,15-20,33; P.53 1,2,4,5,7,13,17; P.77 1,2,5,6,26; P.117 4.

**Additional Problem**   Three planes can fail to have an intersection point, even if no planes are parallel. Consider the two planes $A : x + y + z = 0$ and $B : x - 2y - z = 1$. Use the tool here `https://technology.cpm.org/general/3dgraph/` to visualize these two planes, then answer the following questions:

1. What is the shape of the intersection $A \cap B$ of the two?

2. Use the equations of $A$ and $B$ to construct a third plane $C$ whose intersection with the two is exactly the same as $A \cap B$. That is, $A \cap B \cap C = A \cap B$ (Hint: how can you create a singular system of three equations?)

3. Find a fourth plane $D$ such that $A \cap D$, and $B \cap D$ are both non-empty, but $A \cap B \cap D$ is empty. That is, $D$ should intersect both $A$ and $B$, but the three should never meet. (Hint: Construct a permanent breakdown!)

For both the last two parts, I strongly suggest you use the tool linked above to draw the planes and see your answers!