Training Problems 5

The below exercises are based on Chapter 2 from the *Coding the Matrix* book by Philip Klein.

For Python related problems, you can assume the following:

- from math import pi,e
- from plotting import plot
- scalar_vector_mult(alpha, v) and add2(v, w) are already implemented.

1. Write a comprehension that would plot a line of 51 points, connecting points [2, 1] and [4, 3]. Your graph should have a scale of 10 and your code should just be one line.

2. What is 3([4, 9, 2] + [3, 3, 1]) equal to?

3. Provide the convex combination of the following:
   a.
   $$u_1 = [25]$$
   $$v_1 = [75]$$
   $$\alpha = .25$$
   $$\beta = .75$$

   b.
   $$u_1 = \begin{bmatrix}16\\8\end{bmatrix}$$
   $$v_1 = \begin{bmatrix}12\\15\end{bmatrix}$$
   $$\alpha = .5$$
   $$\beta = .5$$

4. Provide the dot product of the following vectors:
   a. [5, 3, 2, 19, 2] and [1, 2, 3, 4, 5]

   b. [5, 2, 11] and [7, 12, 5]