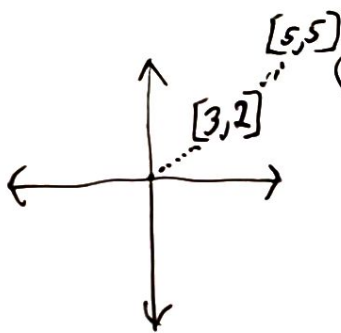


Scalar vector multiplication

ex: $2[5, 4, 10] = [10, 8, 20]$

- You will use the concept of scalar vector multiplication to create a sequence points between vector coordinates on a plane.
- If you have a lot of points between the coordinates, it will look like a line segment.

```
def scalar-vector-mult(alpha, V):  
    return [alpha * V[i] for i in range(len(V))]
```



ex: Let $V = [3, 2]$. Plot 11 points from the origin to V . Your second plot parameter should be 5.

Solution

`Plot([scalar-vector-mult(1/10, V) for i in range(11)], 5)`

The fraction or step of each point from the origin to $[3, 2]$ $10 = 11 - 1$

means 0, 1, 2, ..., 10

```
def add2(V, W):
    return [V[0] + W[0], V[1] + W[1]]
```

2.6.2 from back

ex: Given a pair of points $u = [1, 4]$, $v = [6, 3]$ in \mathbb{R}^2 , write a python comprehension giving the set of 101 points making up the line segment between the two coordinates. Plot it with second plot parameter being 10.

Solution:

Step 1:

$$\underset{\substack{\uparrow \\ v}}{[6, 3]} - \underset{\substack{\uparrow \\ u}}{[1, 4]} = [5, -1]$$

Step 2:

Assume from origin to $[5, -1]$.

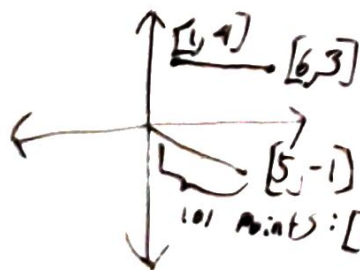
$\text{plot}([\text{scalar_vector_mult}(\frac{i}{100}, [5, -1]) \text{ for } i \text{ in range}(101)], 10)$

Not the final answer, we need to translate (aka shift) it

This is for points between origin and $[5, -1]$

```
def scalar_vector_mult(alpha, v):
```

```
    return [alpha * V[i] for i in range(len(V))]
```



101 points: $[0, 6]$, $[5, -1]$, and 99 points between

Step 3:

Need to translate the plot for the original problem:

$\text{plot}(\text{add2}(\text{scalar.vector.mult}(\frac{1}{100}, [5, -1])), [1, 4] \text{ for } i \text{ in}$

$\text{range}(10)], 10)$

first parameter of
add 2

second
parameter
of add 2

We subtracted $[1, 4]$ in step 1,
but now we need to
add it back.

This is the answer

Instead of doing $[6, 3] - [1, 4]$, You can do $[1, 4] - [6, 3] = [-5, 1]$

$\text{plot}(\text{add2}(\text{scalar.vector.mult}(\frac{1}{100}, [-5, 1])), [1, 4] \text{ for } i \text{ in range}(10)], 10)$

↑
If doing $u - v$, this value will
be $[6, 3]$