SECTION 2.3
EXERCISE #5

2.3.5 If $T([1,0]) = [3,-1]$ and $T([0,1]) = [-2,5]$. Find $T([4,-6])$. Here, T is linear!

Solution

Well, notice that $[4,-6] = 4[1,0] - 6[0,1]$, so

$$T([4,-6]) = T(4[1,0] - 6[0,1])$$
$$= T(4[1,0]) - T(6[0,1]) \text{ since } T \text{ is linear}$$
$$= 4T([1,0]) - 6T([0,1]) \text{ since } T \text{ is linear}$$
$$= 4[3,-1] - 6[-2,5]$$
$$= [12,-4] - [-12,30] = \boxed{[24,-34].} \quad \square$$