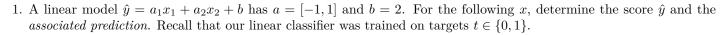
## ML Problem Solving

## Vector arithmetic and linear classifier inference





b) 
$$[[-1],[1]]$$

c) 
$$[[1], [-1]]$$

e) 
$$[[0], [-1.5]]$$

2. Consider that we want to represent  $a \cdot x + b$  as a single vector multiplication  $a \cdot x$ , without explicitly adding the bias b, where a and x are vectors and b is a scalar. What would be the values for a and x for each input?

a) 
$$a = [ _{----}, _{-----}]$$
,  $x = [ _{----}, _{-----}]^T$ 

d) 
$$a = [$$
 \_\_\_\_\_ , \_\_\_\_ , \_\_\_\_ ] ,  $x = [$  \_\_\_\_\_ , \_\_\_\_ , \_\_\_\_ ]^T

3. Now assume we want to calculate all 5 scores in a single matrix multiplication. Is this possible? If it is, write down the matrices and vectors for this data and model. What do we need to change compared to our linear model  $a \cdot x$ ?