Problem set 5
Probabilistic classifiers 2

Excercise 1

1. Let $\overline{W}^T = (w_1, w_2, \ldots, w_d)$ and $\overline{P}^T = (p_1, p_2, \ldots, p_d)$ be points from R^d and let b be a number from R. Compute the distance from $\overline{P}$ to the hyperplane defined by the equation $\overline{W}^T\overline{X} + b = 0$.

2. Show that the distance is proportional to $|\overline{W}^T\overline{P} + b|$, that is the distance is equal to $c \cdot |\overline{W}^T\overline{P} + b|$ for some number c.

Excercise 2

Show the following properties of the logistic sigmoid function $\sigma(x) = \frac{1}{1+e^{-x}}$.

1. $\sigma(x) = 1 - \sigma(-x)$
2. $\frac{\partial\sigma}{\partial x} = e^{-x}\sigma^2(x)$