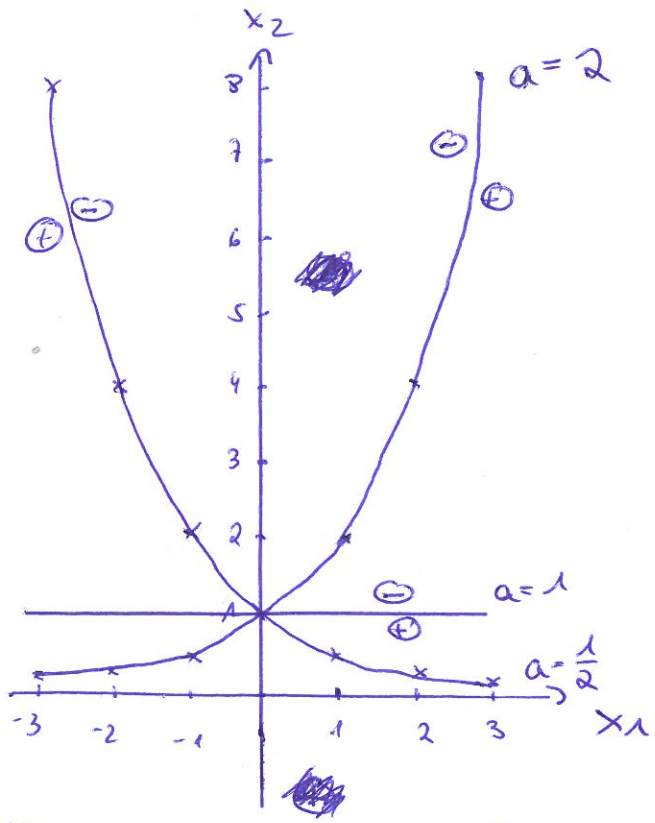
Exercise 1

To determine the classification boundary, we have to compute the points $x \in \mathbb{R}^2$ for which $f(x) = 0$.

a) $f(x) = 0 \iff a^{x_1} = x_2$

This is a power function in x_1.

For $a > 1$ it is monotonely increasing, for $a < 1$ monotonely decreasing. The case $a = 1$ yields the constant function $x_2 = 1$.



All points below the graph of the function are assigned to the class +1 and all points above are assigned to -1.