1. Consider the simple binary hypothesis testing problem

\[ H_1 : \quad Y \sim N(a, 1) \]
\[ H_0 : \quad Y \sim N(0, 1) \]

with \( a \neq 0 \), under the probability of error criterion.

1.a Compute the Bayes value \( V : [0, 1] \to [0, 1] : p \to V(p) \).

1.b Can you show directly that \( V : [0, 1] \to [0, 1] \) is a differentiable function? a concave function?

1.c Find \( p_m \).

2. Solve Part (b) and Part (c) of Exercise II.2 (HVP).

3. Solve Part (b) and Part (c) of Exercise II.3 (HVP).

4. Solve Part (b) and Part (c) of Exercise II.4 (HVP).

5. Solve Part (b) and Part (c) of Exercise II.5 (HVP).

6. Solve Part (b), Part (c) and Part (d) of Exercise II.7 (HVP).

7. Solve Part (a) and Part (b) of Exercise II.9 (HVP).
8. Solve Exercise II.10 (HVP).