$$g(\mathbf{x}) = \sum_{i=1}^{d} w_i x_i + w_0,$$

where

$$w_i = \ln \frac{p_i(1 - q_i)}{q_i(1 - p_i)} \qquad i = 1, ..., d$$

and

$$w_0 = \sum_{i=1}^{d} \ln \frac{1 - p_i}{1 - q_i} + \ln \frac{P(\omega_1)}{P(\omega_2)}.$$