the primal objective of hard-margin SVM is:

$$\min_{a,b} \quad \underbrace{\frac{\|a\|^2}{2}}_{f(a,b)} \qquad \text{where, margin} \propto \frac{1}{\|a\|}$$

s.t. $y_n (a^T x_n + b) \geq 1 \qquad n = 1 \ldots N$

$(y_n = \text{point class}^{(-1/+1)})$

$$\Downarrow$$

$$\underbrace{1 - y_n (a^T x_n + b)}_{g_i(a,b)} \leq 0$$

$$\therefore L(a,b,\lambda) = f(a,b) + \lambda^T g(a,b)$$

$$* p = \min_{a,b} \max_{\lambda \geq 0} L(a,b,\lambda)$$

$$* d = \max_{\lambda \geq 0} \min_{a,b} L(a,b,\lambda)$$

$$= \max_{\lambda \geq 0} \left\{ \min_{a,b} f(a,b) + \lambda^T g(a,b) \right\}$$