Recitation 10 Solutions

1. $(A^TA)^{-1} = \begin{pmatrix} \frac{5}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} \end{pmatrix}$

2. The unit normal vector is $\dfrac{\mathbf{w}}{\|\mathbf{w}\|}$.

3. Let the plane be $\mathbf{w} \cdot \mathbf{x} + b = 0$, and let the point be $\mathbf{p} = (p_1, p_2, ..., p_n)$.

   The distance from the plane to the point is $\dfrac{\mathbf{w} \cdot \mathbf{p} + b}{\|\mathbf{w}\|}$.

4. $\dfrac{\partial L}{\partial w_i} = \sum_{j=1}^{N} -2x_{j,i}(y_j - (\mathbf{w}^T\mathbf{x}_j)$

5. for $\alpha = 1/3$: 0, 2.0, 2.66, 2.88, 2.96, 2.98, 2.99, ...

   for $\alpha = 1$: 0, 6, 0, 6, 0, 6, 0, 6, 0, 6, ...