

1. TTFF

2. D

3. BC

4. ABD

5. D

6.

We get

$$\theta_{MLE} = \arg \max_{\theta} P(X|\theta) = \arg \max_{\theta} \sum_i \log P(x_i|\theta),$$

and

$$\theta_{MAP} = \arg \max_{\theta} P(X|\theta)P(\theta) = \arg \max_{\theta} \sum_i \log P(x_i|\theta) + \log P(\theta).$$

Examples omitted.

7.

(a) $w_0 = \frac{\sum_{i=1}^3 y_i}{3} = \frac{(1) + (-1) + (1)}{3} = \frac{1}{3}.$

(b) $w_1 = (\mathbf{x}^T \mathbf{x})^{-1} \mathbf{x}^T \mathbf{y} = \frac{\sum_{i=1}^3 x_i y_i}{\sum_{i=1}^3 x_i^2} = \frac{(-1) \cdot (1) + (0) \cdot (-1) + (2) \cdot (1)}{(-1)^2 + (0)^2 + (2)^2} = \frac{1}{5}.$