

Solution

$$P(X|\theta) = \mathcal{N}(X|\theta, \sigma^2)$$

$$\mathcal{A}(v) = \mathcal{N}(\theta|a, b^2)$$

$$\begin{array}{ccc} \mathcal{N}(X|\theta, \sigma^2) & & \mathcal{N}(\theta|m, s^2) \\ \downarrow & & \downarrow \\ P(\theta|X) = \frac{P(X|\theta)P(\theta)}{P(X)} \\ \uparrow & & \\ \mathcal{N}(\theta|a, b^2) & & \end{array}$$

