

Question #15

Key: A

The posterior probability density is

$$\pi(p | 1, 1, 1, 1, 1, 1, 1, 1) \propto \Pr(1, 1, 1, 1, 1, 1, 1, 1 | p)\pi(p) \propto p^8(2) \propto p^8.$$

$$\pi(p | 1, 1, 1, 1, 1, 1, 1, 1) = \frac{p^8}{\int_0^5 p^8 dp} = \frac{p^8}{(.5^9)/9} = 9(.5^{-9})p^8.$$

$$\begin{aligned}\Pr(X_9 = 1 | 1, 1, 1, 1, 1, 1, 1, 1) &= \int_0^5 \Pr(X_9 = 1 | p)\pi(p | 1, 1, 1, 1, 1, 1, 1, 1)dp \\ &= \int_0^5 p9(.5^{-9})p^8 dp = 9(.5^{-9})(.5^{10})/10 = .45.\end{aligned}$$