Name _____ Score _____ Teacher _____ Date _____

Bayesian Prediction, Odds, and Bayes Factors

Use total probability for prior and posterior predictive mixtures. Convert probability and odds carefully. Posterior odds equal prior odds times the Bayes factor; the factor measures evidence direction and is not itself a posterior probability.

1. **The odds for H are 6:2. Convert to probability, then convert that probability back to decimal odds.**

Given: Odds a:b mean probability a/(a+b), not a/b as a probability.

2. **4 possible machines have success probabilities 1, 0.1, 0.4, 0.7 and exact prior weights 1/5, 3/10, 2/5, 1/10. Find the prior predictive success probability. After one success, find the posterior weights and posterior predictive probability for the next trial.**

Given: The machine identity stays fixed; trials are conditionally independent given it.

Name _____ Score _____ Teacher _____ Date _____

Bayesian Prediction, Odds, and Bayes Factors

Use total probability for prior and posterior predictive mixtures. Convert probability and odds carefully. Posterior odds equal prior odds times the Bayes factor; the factor measures evidence direction and is not itself a posterior probability.

3. **A data set has Bayes factor BF_HK = 1.2. Interpret the evidence direction. Is 1.2 the posterior probability of H?**

Given: BF_HK=P(data|H)/P(data|K); posterior odds also require prior odds.

4. **Prior odds for H versus K are 3/4. 2 independent evidence item(s) have Bayes factors 1 and 1.3 for H versus K. Find posterior odds and probability of H.**

Given: Multiply odds by each likelihood ratio; a Bayes factor is not a probability.

Name _____ Score _____ Teacher _____ Date _____

Bayesian Prediction, Odds, and Bayes Factors

Use total probability for prior and posterior predictive mixtures. Convert probability and odds carefully. Posterior odds equal prior odds times the Bayes factor; the factor measures evidence direction and is not itself a posterior probability.

5. **The odds for H are 4:3. Convert to probability, then convert that probability back to decimal odds.**

Given: Odds a:b mean probability a/(a+b), not a/b as a probability.

6. **Prior odds for H versus K are 5/4. 1 independent evidence item(s) have Bayes factors 2 for H versus K. Find posterior odds and probability of H.**

Given: Multiply odds by each likelihood ratio; a Bayes factor is not a probability.

Name _____ Score _____ Teacher _____ Date _____

Bayesian Prediction, Odds, and Bayes Factors

Use total probability for prior and posterior predictive mixtures. Convert probability and odds carefully. Posterior odds equal prior odds times the Bayes factor; the factor measures evidence direction and is not itself a posterior probability.

7. **3 possible machines have success probabilities , 0.6, 0.1 and exact prior weights 3/8, 1/2, 1/8. Find the prior predictive success probability. After one success, find the posterior weights and posterior predictive probability for the next trial.**

Given: The machine identity stays fixed; trials are conditionally independent given it.

8. **A data set has Bayes factor BF_HK = 4. Interpret the evidence direction. Is 4 the posterior probability of H?**

Given: BF_HK=P(data|H)/P(data|K); posterior odds also require prior odds.