Name _____ Score _____ Teacher _____ Date _____

Continuous-Prior Bayesian Updating

The parameter theta has support [0,1]. Multiply the prior density by the likelihood, integrate to find the evidence, and normalize to a posterior density. A density height is not probability at one point.

1. Prior density f(theta)=3 theta^2 on [0,1]. Ordered Bernoulli data contain 3 success(es) and 1 failure(s). Find the normalized posterior density.

Given: The ordered-data likelihood is theta^s(1-theta)^f; theta is a continuous hypothesis in [0,1].

2. Prior density f(theta)=1 on [0,1]. Ordered Bernoulli data contain 1 success(es) and 0 failure(s). Find the posterior predictive probability that the next trial succeeds.

Given: Prediction averages theta over the posterior density.

Keep likelihood, prior, evidence, and posterior roles distinct.

Name _____ Score _____ Teacher _____ Date _____

Continuous-Prior Bayesian Updating

The parameter theta has support [0,1]. Multiply the prior density by the likelihood, integrate to find the evidence, and normalize to a posterior density. A density height is not probability at one point.

3. **Prior density f(theta)=2 theta^1 on [0,1]. Ordered Bernoulli data contain 1 success(es) and 0 failure(s). Compute the evidence P(data) by integration.**

Given: The observations are an ordered sequence, so no binomial coefficient is included.

4. **Prior density f(theta)=3 theta^2 on [0,1]. Ordered Bernoulli data contain 1 success(es) and 0 failure(s). State the parameter support and find P(theta=0.75). Explain why the posterior density height at 0.75 is not that probability.**

Given: Theta has a continuous prior and posterior density.

Name _____ Score _____ Teacher _____ Date _____

Continuous-Prior Bayesian Updating

The parameter theta has support [0,1]. Multiply the prior density by the likelihood, integrate to find the evidence, and normalize to a posterior density. A density height is not probability at one point.

5. **Prior density f(theta)=1 on [0,1]. Ordered Bernoulli data contain 2 success(es) and 0 failure(s). Find the normalized posterior density.**

Given: The ordered-data likelihood is theta^s(1-theta)^f; theta is a continuous hypothesis in [0,1].

6. **Prior density f(theta)=2 theta^1 on [0,1]. Ordered Bernoulli data contain 2 success(es) and 0 failure(s). Compute the evidence P(data) by integration.**

Given: The observations are an ordered sequence, so no binomial coefficient is included.

Name _____ Score _____ Teacher _____ Date _____

Continuous-Prior Bayesian Updating

The parameter theta has support [0,1]. Multiply the prior density by the likelihood, integrate to find the evidence, and normalize to a posterior density. A density height is not probability at one point.

7. **Prior density f(theta)=3 theta^2 on [0,1]. Ordered Bernoulli data contain 2 success(es) and 0 failure(s). State the parameter support and find P(theta=0.75). Explain why the posterior density height at 0.75 is not that probability.**

Given: Theta has a continuous prior and posterior density.

8. **Prior density f(theta)=1 on [0,1]. Ordered Bernoulli data contain 3 success(es) and 0 failure(s). Find the posterior predictive probability that the next trial succeeds.**

Given: Prediction averages theta over the posterior density.