Name _____ Score _____ Teacher _____ Date _____

Credible Intervals and Prior Elicitation

A credible interval summarizes posterior belief about a parameter. Compute mass from the printed PMF or CDF, use equal tail quantiles when requested, and do not interpret posterior coverage as a repeated-sample confidence statement.

1. **An expert states prior q10=0.0400, median=0.2000, and q90=0.3600, so the central 80% interval is [0.0400,0.3600]. Choose the compatible parameterized prior: F_1(theta)=(theta/0.4)^1 on [0,0.4], with (q10,q50,q90)=(0.0400,0.2000,0.3600); F_2(theta)=(theta/0.4)^2 on [0,0.4], with (q10,q50,q90)=(0.1265,0.2828,0.3795); F_3(theta)=(theta/0.4)^3 on [0,0.4], with (q10,q50,q90)=(0.1857,0.3175,0.3862).**

Given: For candidate CDF F_k(theta)=(theta/u)^k on [0,u], the p-quantile is u p^(1/k).

2. **A posterior PMF on 4 support values is shown. Find P(2 <= theta <= 3) and state the corresponding credible interval mass.**

Given: Posterior mass is summed over support values inside the closed interval.

theta	1	2	3	4
Posterior	1/6	1/3	1/6	1/3

Name _____ Score _____ Teacher _____ Date _____

Credible Intervals and Prior Elicitation

A credible interval summarizes posterior belief about a parameter. Compute mass from the printed PMF or CDF, use equal tail quantiles when requested, and do not interpret posterior coverage as a repeated-sample confidence statement.

3. **A posterior CDF is F(theta)=theta^3 on [0,1]. Find the 50% equal-tail credible interval.**

Given: An equal-tail interval leaves (1-coverage)/2 posterior probability in each tail.

4. **A 95% credible interval for theta is [4, 6]. Interpret this Bayesian statement and identify an incorrect confidence-style claim.**

Given: Theta is modeled as uncertain under the posterior distribution.

Name _____ Score _____ Teacher _____ Date _____

Credible Intervals and Prior Elicitation

A credible interval summarizes posterior belief about a parameter. Compute mass from the printed PMF or CDF, use equal tail quantiles when requested, and do not interpret posterior coverage as a repeated-sample confidence statement.

5. **A posterior on [0,1] has CDF F(theta)=theta^2. Find P(0.3 <= theta <= 0.8).**

Given: For a continuous posterior, interval mass is a CDF difference; endpoint point masses are zero.

6. **A posterior PMF on 5 support values is shown. Find P(3 <= theta <= 4) and state the corresponding credible interval mass.**

Given: Posterior mass is summed over support values inside the closed interval.

theta	2	3	4	5	6
Posterior	1/7	2/7	1/7	2/7	1/7

Name _____ Score _____ Teacher _____ Date _____

Credible Intervals and Prior Elicitation

A credible interval summarizes posterior belief about a parameter. Compute mass from the printed PMF or CDF, use equal tail quantiles when requested, and do not interpret posterior coverage as a repeated-sample confidence statement.

7. **A posterior CDF is F(theta)=theta^1 on [0,1]. Find the 90% equal-tail credible interval.**

Given: An equal-tail interval leaves (1-coverage)/2 posterior probability in each tail.

8. **A 90% credible interval for theta is [2, 4]. Interpret this Bayesian statement and identify an incorrect confidence-style claim.**

Given: Theta is modeled as uncertain under the posterior distribution.