Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Bernoulli and Normal Model Selection

Identify the random variable and parameters before calculating. Distinguish a normal variance from its standard deviation.

1. **X is Bernoulli with P(X=1)=0.2. Find its PMF, F(-1), mean, and variance.**

Reference: For Bernoulli(p), P(X=1)=p, P(X=0)=1-p, E(X)=p, and Var(X)=p(1-p).

2. **A model is written X ~ N(6, 2^2), where the second slot is the variance. State the support, mean, variance, standard deviation, and PDF.**

Reference: For N(mu,sigma^2), support is all real numbers and f(x)=[1/(sigma sqrt(2pi))] exp[-(x-mu)^2/(2sigma^2)].

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Bernoulli and Normal Model Selection

Identify the random variable and parameters before calculating. Distinguish a normal variance from its standard deviation.

3. **A measurement is continuous, roughly symmetric and bell-shaped with center 7 and standard deviation 3; let X be one measurement. Is a normal model suitable? If so, standardize x=7.**

Reference: A normal model is plausible for an unbounded-looking continuous bell-shaped measurement without strong skew or discrete counts. Standardize z=(x-mu)/sigma.

4. **In inspection batch 4, 12 independent components each pass with probability 0.65. Let X count passes. Choose Bernoulli or binomial and state its parameters.**

Reference: Bernoulli records one binary trial. Binomial counts successes in a fixed number n of independent trials with common p.

State the model or rule, show exact setup, then round only the final decimal.

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5. **In inspection batch 5, a randomly selected component either passes or fails, with pass probability 0.8. Define X=1 for pass and 0 for fail. Choose Bernoulli or binomial and state its parameter.**

Reference: Bernoulli records one binary trial. Binomial counts successes in a fixed number n of independent trials with common p.

6. **X is Bernoulli with P(X=1)=0.2. Find its PMF, F(1), mean, and variance.**

Reference: For Bernoulli(p), P(X=1)=p, P(X=0)=1-p, E(X)=p, and Var(X)=p(1-p).

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Bernoulli and Normal Model Selection

Identify the random variable and parameters before calculating. Distinguish a normal variance from its standard deviation.

7. **A measurement is continuous, roughly symmetric and bell-shaped with center 0 and standard deviation 2; let X be one measurement. Is a normal model suitable? If so, standardize x=-2.**

Reference: A normal model is plausible for an unbounded-looking continuous bell-shaped measurement without strong skew or discrete counts. Standardize z=(x-mu)/sigma.

8. **A model is written X ~ N(1, 3^2), where the second slot is the variance. State the support, mean, variance, standard deviation, and PDF.**

Reference: For N(mu,sigma^2), support is all real numbers and f(x)=[1/(sigma sqrt(2pi))] exp[-(x-mu)^2/(2sigma^2)].