STAT 3332 Statistics for Life Sciences

Spring 2007

Quiz 3

Your Name (Please **PRINT CLEARLY**):

Your *Signature*:

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1. The function

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma}\, e^{-\frac{1}{2\sigma^2}(x-\mu)^2}, \quad -\infty < x < +\infty,$$

(encircle best answer)

(A) is symmetric about μ

(B) is bell-shaped

(C) is the density of Normal(μ, σ^2)

$\boxed{\text{(D)}}$ satisfies each of (A), (B), (C)

(E) satisfies none of (A), (B), (C)

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2. Let random variable X have the Normal distribution with mean 10 and variance 4. Then $P(8 \le X \le 12) =$ (encircle best answer)

$\boxed{\text{(A)}}$ $P(-1 \le N(0,1) \le +1)$

(B) $P(-2 \le N(0,1) \le +2)$

(C) $P(-3 \le N(0,1) \le +3)$

(D) $P(-4 \le N(0,1) \le +4)$

(E) $P(-5 \le N(0,1) \le +5)$

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3. For a random sample of size $n = 100$ from a population with mean μ and variance σ^2, the sample mean $\overline{X}$ satisfies (encircle best answer)

$\boxed{\text{(A)}}$ $E(\overline{X}) = \mu$

(B) $\text{Var}(\overline{X}) = \sigma^2$

(C) $P(\overline{X} > \mu) = 0$

(D) each of (A), (B), (C)

(E) none of (A), (B), (C)

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4. (Continuation) For interval estimation of μ based on $\overline{X}$ and the sample standard deviation s, the interval

$$\left(\overline{X} - \frac{s}{\sqrt{n}}, \quad \overline{X} + \frac{s}{\sqrt{n}}\right)$$

has confidence approximately (encircle best answer)

50% $\boxed{68\%}$ 95% 99%

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5. (Continuation) If this parent population is Normal, then the random variable $\frac{\overline{X}-\mu}{s/10}$ has distribution (encircle best answer)

$N(0,1)$ $\boxed{t \text{ with 99 degrees of freedom}}$ Poisson with mean μ $N(\mu, 1)$
