MATH 302 WORKSHEET VI SPRING 2012 NAME:____
(PLEASE PRINT LEGIBLY)

1. Let X_1 be a random sample from a $N(x, \mu_X, \sigma_X)$ such that $\mu_X = 40$ and $\sigma_X^2 = 64$. Find the approximate $\Pr(X > 44)$.

2. Let X_1, X_2, X_3, X_4, X_5 be a random sample from a $N(x, \mu_X, \sigma_X)$ such that $\mu_X = 40$ and $\sigma_X^2 = 64$.

A. Find the approximate $\Pr(\overline{X} > 44)$.

B. Find the approximate $\Pr(S < 8)$.

C. Find the approximate $\Pr(\sum_{i=1}^{5} X_i > 220)$.

D. Let $Z_1^2 = \left(\frac{X_1 - \mu_X}{\sigma_X}\right)^2$, $Z_2^2 = \left(\frac{X_2 - \mu_X}{\sigma_X}\right)^2$, $Z_3^2 = \left(\frac{X_3 - \mu_X}{\sigma_X}\right)^2$, $Z_4^2 = \left(\frac{X_4 - \mu_X}{\sigma_X}\right)^2$, $Z_5^2 = \left(\frac{X_5 - \mu_X}{\sigma_X}\right)^2$

Find the approximate $\Pr(\sum_{i=1}^{5} Z_i^2 < 7)$.

E. Let $Z_1 = \frac{X_1 - \mu_X}{\sigma_X}, \ldots, Z_5 = \frac{X_5 - \mu_X}{\sigma_X}$ Find the approximate $\Pr(Z_3^2 < \frac{49}{9})$.

F. Let $Z_1 = \frac{X_1 - \mu_X}{\sigma_X}, \ldots, Z_5 = \frac{X_5 - \mu_X}{\sigma_X}$ Find the approximate $\Pr(Z_3 < \frac{7}{3})$.

G. Let $Z_1 = \frac{X_1 - \mu_X}{\sigma_X}, \ldots, Z_5 = \frac{X_5 - \mu_X}{\sigma_X}$ Find the approximate $\Pr(\sum_{i=1}^{5} Z_i < \frac{7}{5})$.

3. Let X_1, X_2, . . . , X_{10}, X_{11}, X_{12} be a random sample from a $N(x, \mu_X, \sigma_X)$ such that $\mu_X = 40$ and $\sigma_X^2 = 64$.

A. Find the approximate $\Pr(\overline{X} > 44)$.

B. Find the approximate $\Pr(S < 8)$.

C. Let $Z_1^2 = \left(\frac{X_1 - \mu_X}{\sigma_X}\right)^2$, $Z_2^2 = \left(\frac{X_2 - \mu_X}{\sigma_X}\right)^2$, $Z_3^2 = \left(\frac{X_3 - \mu_X}{\sigma_X}\right)^2$, $Z_4^2 = \left(\frac{X_4 - \mu_X}{\sigma_X}\right)^2$, $Z_5^2 = \left(\frac{X_5 - \mu_X}{\sigma_X}\right)^2$

Find the approximate $\Pr(\sum_{i=1}^{12} Z_i^2 < 7)$.

4. Let X_1 be a random sample from a $N(x, \mu_X, \sigma_X)$ such that $\mu_X = 40$ and $\sigma_X^2 = 64$.
Find the approximate $\Pr(X > 44)$.

5. Let X_1, X_2, X_3, X_4, X_5 be a random sample from a $N(x, \mu_X, \sigma_X)$ such that $\mu_X = 40$ and $\sigma_X^2 = 64$.
Find the approximate $\Pr(\overline{X} > 44)$.

6. Suppose X_1, X_2, X_3, X_4 is a random sample from an $N(x, \mu_X = 50, \sigma_X = 14)$.
Find the approximate probability that $\Pr(43 \le \overline{X} \le 71)$.

7. Suppose X_1, X_2, X_3, X_4 is a random sample from an $N(x, \mu_X = 50, \sigma_X = 14)$.

Find the approximate probability that $\Pr\left(0.5248 \le \dfrac{S_X^2}{\sigma_X^2} \le 1.62584\right)$.

8. Suppose Z_1, Z_2, Z_3, Z_4, Z_5 is a random sample from an $N(z, \mu_Z = 0, \sigma_Z = 1)$
Let $V = Z_1^2 + Z_2^2 + Z_3^2 + Z_4^2 + Z_5^2$ Find the approximate probability that $\Pr(V \le 13.0784)$.

9. Let $X_1, X_2, X_3, X_4, \ldots, X_9$ is an i.i.d. from a $N(x, \mu_X, \sigma_X)$ distribution $\sigma_X \neq 0$
Suppose we 'allow that $\mu_X = 100$ and $\sigma_X = 15$.[1]
Approximate $\Pr(S \le 21)$.

[1] We allow mean previous research indicates these are not unreasonable estimates; so, we 'say' they are (even though no one the actual values).