University of Jordan	Math. Stat. (Math.131)
Math. Dept.	HW Set #3

Question 1: Find the 95th and the 5th percentiles of

(a) N(60, 25) (b) t-distribution with 8 degrees of freedom (c) χ^2_{10}

Question 2: Define the following terms:

(a) standard error of an estimator (b) unbiased estimator
(c) level of significance of a test (d) probability of type II test
(e) critical region (f) $(1-\alpha)100\%$ C. I.
(g) p-value

Question 3: It is required to estimate θ. Find the required sample size to be 95% sure that your estimator is within ε from θ if

(a) $\theta = \mu$, $\varepsilon = 2$, and $\sigma = 3$ (b) $\theta = p$, $\varepsilon = 0.02$.

Question 4: Answer with True or False (justify)

If H_0: $\theta = \theta_0$ is rejected at $\alpha = 0.01$ then

(a) H_0 may be rejected for some $\alpha < 0.1$ (b) H_0 is rejected for all $\alpha < 0.1$
(c) H_0 may be rejected for some $\alpha > 0.1$ (d) H_0 is rejected for all $\alpha > 0.1$
(e) H_0 is accepted for all $\alpha < 0.1$ (f) H_0 may be accepted for some $\alpha < 0.1$
(g) H_0 is accepted for all $\alpha > 0.1$ (h) H_0 may be accepted for $\alpha > 0.1$
(h) A 90% C. I. for θ should not contain θ_0 if H_1: $\theta \neq \theta_0$

Question 5: Let $X_1, \ldots, X_{15}$ be a r.s. from B(1, p). Let $Y = \sum_{i=1}^{15} X_i$. Assume that H_0: $p=0.7$ is rejected vs. H_1: $p < 0.7$ if $Y \leq 11$. Find

(a) The level of significance α (b) β when p = 0.5.

Question 6: Let $X_1, \ldots, X_{15}$ be a r.s. from $N(\mu, \sigma^2)$ such that $\overline{X} = 60$ and $\sigma = 3$. Find the p-value in each of the following cases:

(a) H_0: $\mu = 62$ vs. H1: $\mu \neq 62$ (b) H_0: $\mu = 62$ vs. H1: $\mu < 62$

Question 7: Two samples from two independent populations gave the following

	Group I	Group II
n	36	64
$\overline{X}$	60	65
S^2	5	4
$\hat{p}$	0.2	0.3

(a) Find 95% C. I. for μ_I, p_I, σ^2_{II}, $\mu_I - \mu_{II}$, $p_I - p_{II}$
(b) Test H_0: $\mu_I = 62$ vs. H_1: $\mu_I < 62$
(c) Test H_0: $p_I = 0.15$ vs. H_1: $p_I > .15$
(d) Test H_0: $\mu_I = \mu_{II}$ vs. H_1: $\mu_I \neq \mu_{II}$
(e) Test H_0: $p_I = p_{II}$ vs. H_1: $p_I < p_{II}$
(f) Test H_0: $\sigma^2_I = 4$ vs. H_1: $\sigma^2_I > 4$