Name:

1) Time to respond for 911 calls was measured for 75 calls in two cities, $C1$ and $C2$. The results of the study were:

Measure	C1	C2
Sample size	75	75
Sample mean	5.4	6.1
Sample variance	1.57	2.54

a) Estimate the difference in the mean response time for the two cities.

b) Find a bound for the error of estimation.

2) An exit poll of $1,000$ voters finds that 530 supported a certain candidate.

a) Estimate the proportion of the voting population that supports the candidate.

b) Find a bound for the error of estimation.

3) Suppose Y is a single observation from an exponential distribution with unknown mean θ.

a) Use the method of moment-generating functions to show that $2Y/\theta$ is a pivotal quantity having a χ^2 distribution with two degrees of freedom.

b) Use the pivotal quantity from part a) to derive a 90% confidence interval for θ. Compare your result with Example 8.4 in the text.

4) Now suppose $(Y_1, \ldots, Y_9)$ is a sample of size $n = 9$ from an exponential distribution with mean θ.

a) Use the method of moment-generating functions to show that

$$\frac{2}{\theta} \sum_{i=1}^{9} Y_i$$

is a pivotal quantity having a χ^2 distribution with 18 degrees of freedom.

b) Use the pivotal quantity from part a) to derive a 95% confidence interval for θ.

5) Let $(Y_1, \ldots, Y_5)$ be a sample of size $n = 5$ from a gamma distribution with $\alpha = 2$ and β unknown.

a) Use the method of moment-generating functions to show that

$$\frac{2}{\beta} \sum_{i=1}^{5} Y_i$$

is a pivotal quantity having a χ^2 distribution with 20 degrees of freedom.

b) Use the pivotal quantity from part a) to derive a 95% confidence interval for θ.