Your Name:

Duration of the Quiz is 30 minutes. There are four problems, worth 20 points. Show all your work for full credit. Books, notes etc. are prohibited.

(1) A public health official is planning for the supply of influenza vaccine needed for the upcoming flu season. She took a poll of 350 local citizens and found that only 126 said they would be vaccinated. Find the 90% confidence interval for the true pro- portion of people who plan to get the vaccine. **Hint:** $z_{0.05} = 1.645$

(2) Suppose that 6.5, 9.2, 9.9, and 12.4 constitute a random sample of size 4 from a normal distribution with an unknown mean μ and standard deviation 0.8. Find a 95% confidence interval for μ . Hint: $z_{0.025} = 1.96$

(3) Let X_1, X_2, \ldots, X_n be a random sample from a discrete pdf $p_X(k;\theta)$, where $\theta = E(X)$ is an unknown parameter. Consider the estimator

$$\hat{\theta} = \sum_{i=1}^{n} a_i X_i,$$

Where the a_i 's are constants. For what values of a_1, a_2, \ldots, a_n will $\hat{\theta}$ be unbiased?

(4) A random sample of size 2, Y_1 and Y_2 , is drawn from the pdf

$$f_Y(y;\theta) = 2y\theta^2, \ 0 < y < \frac{1}{\theta}.$$

What must c equal if the statistic $c(Y_1 + 2Y_2)$ is to be an unbiased estimator for $\frac{1}{\theta}$?