

Quiz 4 for Statistics 301
Elementary Statistical Methods - Spring 2000
Material Covered: Chapter 7 of Workbook and text
For: Friday, 10th March

Name (please print): _____
last first

Let X be a random variable that represents white blood cell count per cubic millimeter of whole blood. Assume that X has a distribution that is normal with mean $\mu = 7500$ and estimated standard deviation $\sigma = 1750$. A test result of $X < 3500$ is an indication of leukopenia.

(a) [1] The probability that on a single test X is less than 3500

is _____.

(b) [1] Suppose a doctor uses the average \bar{X} for two tests taken about a week apart?

$P(\bar{X} < 3500) =$ _____.

(c) [1] Suppose a doctor uses the average \bar{X} for *three* tests each taken about a week apart?

$P(\bar{X} < 3500) =$ _____.

(d) [1] As the sample size increases, the variance of the average of a random sample (circle one) **decreases** / **remains the same** / **increases** / **is unknown**.

(e) [1] As the sample size increases, the expected value of the average for a random sample (circle one) **decreases** / **remains the same** / **increases** / **is unknown**.

(f) [1] Compare and contrast *simulation* and the *central limit theorem*.

- (a) [1] 0.011
- (b) [1] 0.000613
- (c) [1] 0.0000377
- (d) [1] **decreases**
- (e) [1] **remains the same**
- (f) [1] Both simulation and the central limit theorem are used to approximate sampling distributions. However, whereas simulation provides a numerical approximation to the actual distribution of any statistic from a random sample, the CLT provides an analytical approximation to the normal distribution for the average of a random sample.