11.33 RADON DETECTORS Many homeowners buy detectors to check for the invisible gas radon in their homes. How accurate are these detectors? To answer this question, university researchers placed 12 radon detectors in a chamber that exposed them to 105 picocuries per liter of radon. The detector readings were as follows.[7]

| 91.9 | 97.8 | 111.4 | 122.3 | 105.4 | 95.0 | 103.8 | 99.6 | 96.6 | 119.3 | 104.8 | 101.7 |

(a) Make a stemplot of the data. The distribution is somewhat skewed to the right, but not strongly enough to forbid use of the t procedures.

(b) Is there convincing evidence that the mean reading of all detectors of this type differs from the true value 105? Carry out a test in detail, then write a brief conclusion.

11.36 AP FREE-RESPONSE SCORES About 42,000 high school students took the AP Statistics exam in 2001. The free-response section of the exam consisted of five open-ended problems and an investigative task. Each free-response question is scored on a

0 to 4 scale (with 4 being the best). A random sample of 25 student papers yielded the following scores on one of the free-response questions:

| 1 | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 1 | 1 | 0 | 2 | 4 | 1 | 0 | 2 | 0 | 3 |

(a) Is a sample of 25 papers large enough to provide a good estimate of the mean score of all 42,000 students on this exam problem? Justify your answer.

(b) Do you think the population of scores on this question is normally distributed? Explain why or why not.

(c) Construct a 95% confidence interval for the mean score on this exam question.