Your Answers should include sketch + Sentence!

AP Stat Worksheet: Sample Means Name Mine

1. A survey found that the American family generates an average of 17.2 pounds of glass garbage each year. Assume the distribution is normal with a standard deviation of 2.5 pounds.

   a. What is the probability that a randomly selected family will generate more than 18 pounds of garbage? $\mu = 17.2 \quad \sigma = 2.5 \quad n = 1$

   $P(x > 18) = P\left(z > \frac{18 - 17.2}{2.5}\right) = P(z > .32) = .3745 = 37.45\%$

   b. What is the probability that the mean sample of 55 families will be between 17 and 18 pounds? $n = 55$

   $P(17 < \bar{x} < 18) = P\left(\frac{17 - 17.2}{\frac{2.5}{\sqrt{55}}} < z < \frac{18 - 17.2}{\frac{2.5}{\sqrt{55}}}\right) = P(-.593 < z < 2.37) = .715$

   c. If the distribution of glass garbage produced by the population were not normal, describe the distributions for a) and b).

   a) $n = 1$, not normal

   b) $n = 55$, CLT normal

2. The average yearly cost per household of owning a dog is \$186.80. Assume the standard deviation of the distribution is \$32. Suppose we randomly select 50 households that own a dog. What is the probability that the sample mean for these 50 households is less than \$175?

   $\mu = 186.80 \quad \sigma = 32 \quad n = 50$

   $P(\bar{x} < 175) = P\left(z < \frac{175 - 186.80}{\frac{32}{\sqrt{50}}}\right) = P(z < -2.61) = .005$

3. The average teacher's salary in New Jersey (ranked first among states) is \$52,174. Assume the distribution is normal with a standard deviation of \$700. $\mu = 52,174 \quad \sigma = 700$

   a. What is the probability that a randomly selected teacher makes less than \$50,000 a year?

   $P(x < 50,000) = P\left(z < \frac{50000 - 52174}{700}\right) = P(z < -3.106) = .0009$

   b. If we sample 100 teachers' salaries, what is the probability that the sample mean is less than \$50,000? $n = 100$

   $P(\bar{x} < 50,000) = P\left(z < \frac{50,000 - 52174}{\frac{700}{\sqrt{100}}}\right) = P(z < -31) = 0$