Math 10 - Homework 4 MPS

1. High Fructose Corn Syrup (HFCS) is a sweetener in food products that is linked to obesity and type II diabetes. The mean annual consumption in the United States in 2008 of HFCS was 60 lbs with a standard deviation of 20 lbs. Assume the population follows a Normal Distribution.

    a. Find the probability a randomly selected American consumes more than 50 lbs of HFCS per year.

    b. Find the probability a randomly selected American consumes between 30 and 90 lbs of HFCS per year.

    c. Find the 80th percentile of annual consumption of HFCS.

    d. In a sample of 40 Americans how many would you expect consume more than 50 pounds of HFCS per year.

    e. Between what two numbers would you expect to contain 95% of Americans HFCS annual consumption?

    f. Find the quartiles and Interquartile range for this population.

    g. A teenager who loves soda consumes 105 lbs of HFCS per year. Is this result unusual? Use probability to justify your answer.

    h. In a sample of 16 Americans, what is the probability that the **sample mean** will exceed 57 pounds of HFCS per year?

    i. In a sample of 16 Americans, what is the probability that the **sample mean** will be between 50 and 70 pounds of HFCS per year.

    j. In a sample of 16 Americans, between what two values would you expect to see 95% of the **sample means**?

2. A normally distributed population of package weights has a *mean* of 63.5 g and a *standard deviation* of 12.2 g.

   a. What percentage of this population weighs 66 g or more?

   b. What percentage of this population weighs 41 g or less?

   c. What percentage of this population weighs between 41 g and 66 g?

   d. Find the 60th percentile for distribution of weights.

   e. Find the three quartiles and the interquartile range.

   f. If you sample 16 packages, find the probability the sample **mean** is over 66 g. Compare answer to part a.

   g. If you sample 49 packages, find the probability the sample **mean** is over 66 g. Compare answer to part a.

3. A pollster sampled 100 adults in California and asked a series of questions. The Central Limit Theorem for Proportions requires that np > 10 and n(1-p) > 10. Determine if these conditions are met for the following statements.

   a. 61% of Californians live in Southern California.

   b. 92% of Californians support Deferred Action for Childhood Arrivals (DACA)

   c. 8% of Californians have a felony conviction.

4. 24% of Californians have visited Yosemite National Park. A pollster samples 1000 Californians.

   a. Determine the expected value and standard deviation of the sample proportion.

   b. Determine that the condition for normality is satisfied.

   c. Determine the probability the sample proportion exceeds 0.40.