STAT/MA 41600
In-Class Problem Set #35: November 7, 2016

1. Suppose that the weight of a randomly chosen beagle is Normally distributed with mean 17.2 pounds and standard deviation 1.8 pounds. Let X denote the weight of such a randomly chosen beagle (in pounds).
1a. Find $P(17 < X < 18)$.
1b. Find $P(|X - 17.2| > 1)$.
1c. Find $P(\frac{X-17.2}{1.8} < 2)$.

2. Same setup as question #1.
2a. Find $P(X > 19 \mid X > 18)$.
2b. Find $P(X < 19 \mid X < 20)$.
2c. Find a value c such that $P(17.2 - c < X < 17.2 + c) = 0.40$.

3. Same setup as question #1. Suppose that 10 beagles are weighed (and their weights are independent). Consider the weight of a beagle to be "heavy" if it weighs more than 19 pounds. Let Y denote the number of beagles that are "heavy," among these 10 beagles.
3a. What kind of random variable is Y? What is/are the parameter(s) of Y?
3b. Find $P(Y \geq 3)$.

4. Suppose that X is a Normal random variable with $\mathbb{E}(X) = 5$ and $\text{Var}(X) = 2$.
4a. What is the probability that X is positive?
4b. Let $Y = \frac{1}{3}X - 2$. What is the probability that Y is positive?