MA 385 Name _____
Fall 2018
Dr. Johnson

HW #4
The problems below are due on Tuesday Oct 23 at 1:00pm. All standard homework rules apply.

1. The number of grams a framing nail weighs is normally distributed with an average weight of 3 grams and a standard deviation of 0.1 grams.
   a) Draw the distribution.
   b) Find P(2.9 < x < 3.1).
   c) Find the probability that the weight of a framing nail is more than 3.2 grams given that it weighs more than 3 grams.

2. Let *y* be a weight in grams of an item produced by a certain process. Assume that *y* is normally distributed with $\mu = 100$ and $\sigma^2 = 25$.
   a. What proportion of the items have weight below 100g?
   b. The specifications for this item are 100 ± 12. What proportion of these items are "out of specification"?
   c. What value of *c* makes the inequality $P(y \leq c) = 0.05$ true?

3. Given the joint probability distribution of X and Y below,

Y	X=5	6	7
10	.20	.10	.10
15	.15	.15	.10
20	.05	.10	.05

   a) Find P(X +Y $\leq$ 21)
   b) Compute the marginal distributions of X and Y.

4. The ACT ASPIRE math test scores are normally distributed with a mean of 50 and a standard deviation of 10.
   A) What is the probability that a randomly selected student earns a score of at least 42?
   B) What is the probability that a randomly selected student earns a score between 33 and 48?

5. Suppose 2 cartons of yogurt are randomly chosen without replacement from a twelve pack of Dannon yogurt, in which there are 3 blueberry flavored cartons, 4 strawberry and 5 vanilla. Let X denote the number of blueberry cartons chosen. Let Y denote the number of strawberry chosen.
   a) Find $f(x, y)$ (the joint probability distribution). Display $f(x, y)$ in a table.
   b) Find the marginal probabilities and put them in the margins of the table, like we did in class.
   c) Find E(X)