MT 143, Quiz #4, Spring 2020   Name _____

Instructions: Show all work. Answers without work can only be graded all or nothing. Partial credit is available only when work is shown. Answer all parts of each problem. Provide explanations as indicated. You may use Minitab or any other statistical software (such as a calculator or Excel) to complete any required statistical calculations or graphs.

1. Answer the questions that follow based on the contingency table shown, assuming that a random person is selected from the sample.

Row Labels (Homeownership)	Column Labels (Product Purchase Category)			
	Drink	Food	Non-Consumable	Grand Total
N	504	4023	1088	5615
Y	746	6130	1568	8444
Grand Total	1250	10153	2656	14059

   a. What is the probability that the person selected bought a food product?

      P(F)=10153/14059 or 72.2%
   b. What is the probability that the person selected owns their own home?

      P(HO)=8444/14059 or 60.1%
   c. What is the probability that the person selected both owns their home and purchased food?

      P(F and HO)=6130/14059 or 43.6%
   d. What is the probability that the person selected either owns their own home or purchased food?

      P(F or HO)=12467/14059 or 88.7%
   e. What is the probability that the person selected owns their home given that they purchased food?

      P(HO|F)=6130/10153 or 60.4%
   f. What is the probability that the person selected purchased food given that they owned their own home?

      P(F|HO)=6130/8444 or 72.6%
   g. Is home ownership and food purchase independent? Explain (with math!).

      They are dependent, since P(F) does not equal P(F|HO) / P(HO) does not equal P(HO|F)
2. Find the missing value in the discrete probability distribution shown below. Then find the mean of the distribution.

x	1	3	4	6	10
$p(x)$	0.15	0.21	0.06	0.28	0.30

$$\mu = 1(0.15) + 3(0.21) + 4(0.06) + 6(0.28) + 10(0.30) = 5.7$$