MATH 3020
Homework 2

Due: 26 January 2018

NAME: _____

Problem 1. Give a quantitative population with 6 members so that $\mu = 0$ and $\sigma = 1$.

Problem 2. Give a quantitative population with 6 members so that $\mu = 1$ and $\sigma = 0$.

Problem 3. A study of the flight times of 6 flights from Dulles to LAX had an median of 263 minutes.

258	257	258	???	272	285

Compute the missing number, please show your work.

Problem 4. A study of heights of students in a class (rounded up to the nearest inch) is:

$$\{68, 68, 67, 63, 74, 72, 73, 66, 69, 70, 78, 64, 66, 68, 104\}.$$

Compute the following descriptive statistics (include units): median, mode, sample mean, sample variance, the quartiles Q_1, Q_2, and Q_3. Then graph the data as a dot plot, stemplot, and and a boxplot.

For problems 1-4 circle your answer:

Problem 5. Let $A \setminus B$ denote the set of outcomes contained in A that are not in B. Which of the following is another way of writing $A \setminus B$:

$B^c \cup A^c$ $\quad$ $(A \cap B)^c \cup B$ $\quad$ $A \cap (B^c)$ $\quad$ $A \cup (A^c \cap B) \cup A^c$.

Problem 6. Suppose $P(A) = .4$, $P(B) = .3$ and $P(A \cap B) = .3$, compute $P(A \cup B)$.

Problem 7. Using the previous problem's events and probabilities what can we say about A and B?

Problem 8. Let $P(A) = .3$, $P(B) = .25$, $P(C) = .21$, $P(A \cup B) = .55$, and $P(A \cap C) = .063$. Are any events independent?

Problem 9. Out of 40 basketball players trying to make a team, 5 will be chosen as starters. There are 26 seniors trying out and the remaining players are juniors. The coach wants 2 seniors and 3 juniors to be starters. In addition the coach wants a senior starter to be the team captain. In how many ways can the coach select the starters with a captain from the 40 players who try out?

Problem 10. A poker hand consists of five cards. If a hand contains three cards of the same denomination, but the other two are different from the first three and different from each other, we say this hand is a "three-of-a-kind." What is the probability of being dealt a "three-of-a-kind?" Write your answer in terms of binomial coefficients and indicate what each is counting.

Problem 11. Given $P(A|B) = .5$, $P(B|A) = .4$ and $P(B|A^c) = .3$, determine $P(A)$.

Problem 12. Consider the following distribution given by the table:

Value	Probability
$X = 0$	.12
$X = 1$	.03
$X = 2$	.3
$X = 3$	.15
$X = 4$	.25
$X = 5$	??

Assume all of the values X can take are shown on the table. Compute $P(X = 5)$, $E[X]$ and $V(X)$.