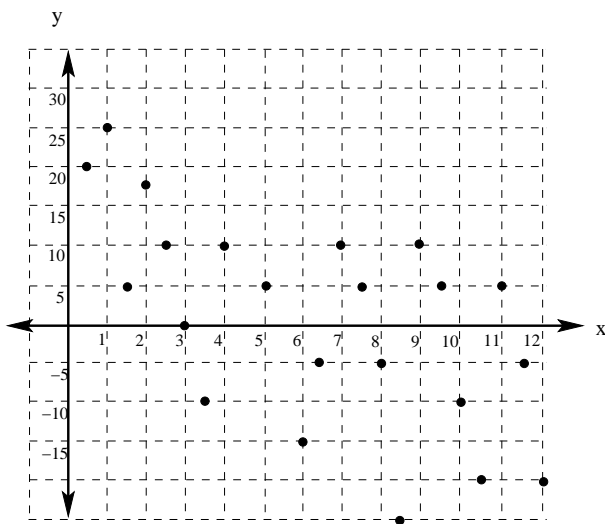


Math 102
Final Exam Practice Problems - Part 2

1. Compute the value of each of the following:
 - (a) $\frac{7!}{4!}$
 - (b) $P(12, 7)$
 - (c) $\frac{8!}{12!}$
 - (d) $C(10, 7)$
2. A company that has 750 employees wants to assign an copy code to each one of their employees. The copy machine has a number pad that only has the digits 1 through 5 on it. What is the smallest number of digits the codes can have is each employee is given their own unique copy code?
3. Suppose a laundry basket contains 5 red socks and 7 white socks. How many ways can the socks be folded into pairs:
 - (a) If we insist that each pair of socks has two socks of the same color.
 - (b) If we don't care what colors end up together in each pair.
4. Suppose you and 5 friends are taking a summer road trip to California in a rented minivan that has 7 seats.
 - (a) How many ways can the six of you be seated in the van?
 - (b) What if only three of you are over 21, and only people over 21 are legally allowed to drive the van?
 - (c) What if only 3 of you are over 21, and your friend Bob, who is under 21, refuses to sit anywhere else but in the front passenger seat?
5. Suppose you work at a job delivering pizzas. You are given 7 pizzas to deliver in West Fargo. How many different ways can you complete these deliveries?
6. A bag contains 10 green balls, 5 red balls, and 4 orange balls.
 - (a) Suppose 2 balls are drawn from the bag at the same time, without replacement.
 - i. Find the probability that both balls are green.
 - ii. Find the probability that both balls are the same color.
 - iii. Find the *odds* in favor of drawing one green and one red ball.
 - (b) Rework the previous problem, but now assume that the two balls are drawn with replacement.
7. A survey of 50 people finds that 40 of them like football, 22 of them like baseball, and 15 like both. Suppose that one participant is randomly selected from among all the people who participated in the survey.
 - (a) Find the probability that the person likes baseball but not football.
 - (b) Find the probability that the person likes either football or baseball.
 - (c) Find the probability that the student is taking neither football nor baseball.
 - (d) Given that the person likes football, what is the probability that the person also likes baseball?
8. Consider the following game: A bag contains 8 red balls and 3 green balls. There are two ways to play -
Option 1: Pay \$2 for the opportunity to draw one ball out of the bag. If you draw a red ball, you lose your \$2. If draw a green ball, you win \$5 (your original \$2, plus \$3 more).
Option 2: Pay \$5 for the opportunity to first flip a coin, and then draw one ball out of the bag. If the you flip heads, then if you draw a red ball, you lose your \$5, while if you draw a green ball, you win \$10, your original \$5 plus \$5 more. If you flip tails, then if you draw a green ball, you lose your \$5, while if you draw a red ball, you win \$8, your original \$5 plus \$3 more.
 - (a) Find the expected value for playing Option 1 of this game. Is this game fair?
 - (b) Find the expected value for playing Option 2 of this game. Is this game fair?

9. Suppose 2 cards are drawn without replacement from a deck of 52 cards. Find the probability that:
- two cards from the same suit are drawn.
 - two face cards are drawn.
 - a pair is drawn.
 - a pair of aces is drawn.
10. A researcher wants to find out who will win the upcoming presidential election. To find out about this, she goes out to the local shooting range and asks people to fill out a survey. Although many people are not willing to take the time to answer, she eventually gets 50 responses. Of those that responded, 11 people say they plan to vote for Barack Obama, 7 people say they plan to vote for Hillary Clinton, and 32 people say they plan to vote for John McCain.
- What is the population in this survey? What is the sample?
 - What forms of bias, if any, may have effected the data collected in this survey? Explain your reasoning.
 - Based on this study, what conclusions, if any, can be reached about who will win the upcoming Presidential election? Explain your reasoning.
11.
 - Give an example of a real life situation where the mean is the most appropriate measure of central tendency.
 - Give an example of a real life situation where the median is the most appropriate measure of central tendency.
 - Give an example of a real life situation where the mode is the most appropriate measure of central tendency.
12. Suppose that you got scores of 78, 85, 82, and 75 on 4 exams worth 100 points each.
- What grade would you need to get on a 200 point final exam in order to end up with an average of 70 percent?
 - What grade would you need to get on a 200 point final exam in order to end up with an average of 80 percent?
 - What grade would you need to get on a 200 point final exam in order to end up with an average of 90 percent?
13. Given the data set $\{2, 5, 12, 21, 27, 13, 6, 11, 5, 12, 24, 7\}$
- Find the mean, median, and mode of this data set.
 - Make a stem and leaf display for this data set.
 - Find the 5 number summary of this data set.
14. Given the following frequency table: Frequency Bar Graph:
- | x | frequency |
|-----|-----------|
| 5 | 7 |
| 9 | 4 |
| 12 | 3 |
| 15 | 8 |
| 21 | 6 |
- In the space provided above, make a frequency bar graph for the data in the table above.
 - Compute the mean and median of the data in this table.
15. Find the mean and standard deviation of the data set: $\{3, 7, 12, 14, 17, 25\}$

16. Suppose that 500 test scores (on a 100 point test) are approximately normally distributed with a mean of 72, and a standard deviation of 6.
- What percentage of scores are above 85 points?
 - How **many** scores are below 50 points?
 - What percentage of scores are between 65 and 80 points?
 - What score would a person need to get on the test in order to have scored higher than 70% of the people who took this test?
17. A 16oz jar of peanut butter cost \$1.78 in 1995. In 2005, a similar jar cost \$2.99.
- Find a line that models the price of peanut butter over time (hint: you can take $x = 0$ to represent 1995)
 - Use your model to predict the price of peanut butter in 2010.
 - According to your model, when will the price of peanut butter reach \$5.00 for a 16oz jar?
18. Given the scatter plot shown here:



- Sketch in an estimated linear regression line for this data.
- Is the correlation coefficient positive or negative for this data?