MA 138 Exam 3 Review Problems
Reminder: You may not use the calculator in your cell phone during the exam.

Note: This is NOT a practice exam. It is a collection of problems to help you review some of the material for the exam and to practice some kinds of problems. This collection is not necessarily exhaustive; you should expect some problems on the exam to look different from these problems.

Review homework problems on graphs (pie, stem-n-leaf, line, histograms, etc.), normal curve, percentiles, etc!!!!

1. Find the mean and median for the following list of test scores:
   67, 93, 74, 83, 62, 56, 90, 70, 88, 95, 74, 74, 65, 84, 70, 71, 89, 91, 95

2. Ten newborn babies at a hospital had these weights in pounds:
   7.0, 9.5, 6.8, 7.1, 10.1, 8.6, 5.9, 6.2, 7.7, 8.1.
   a. What is the mean weight of these ten babies?
   b. What must be the weight of an eleventh baby for the mean weight to become 8.5 pounds?

3. The average of six daily high temperatures is 58˚ Fahrenheit. If two of the temperatures were 48˚ and 32˚, what was the average of the other four temperatures?

4. Lindsay is the CEO of a company that reports the mean income for their 10 employees is $85,000 including her salary. If she gets $210,000 a year, what is the mean income of the other 9 employees?

5. Mr. Smith's class of 42 students had a mean score of 74% on an exam. Mrs. Jones's class of 33 students had a mean score of 84% on the same exam. What was the overall mean score of both classes?

6. Find the mean, median, upper quartile, and lower quartile of the following test scores:
   43, 43, 53, 54, 55, 58, 58, 60, 62, 62, 63, 68, 70, 78, 83, 85, 86, 86, 89, 92

7. Construct a box-and-whisker plot for the following data. Indicate any outliers with asterisks. Identify numbers that you used to construct the plot.

   55, 68, 72, 74, 75, 76, 76, 77, 80, 82, 82, 83, 83, 83, 85, 86, 86, 87, 87, 87, 88, 88, 90, 90, 90, 94, 94, 96, 99, 102

8. The following test scores are for two classes that took the same test. The highest possible score on the test was 60. Construct a box-and-whisker plot for the data. Indicate any outliers with asterisks. Which class appears to have performed better on the test? Defend your choice.

   Class 1 (32 scores): 19, 24, 27, 34, 35, 35, 38, 39, 40, 40, 41, 41, 42, 43, 44, 44, 45, 47, 48, 49, 50, 50, 51, 51, 53, 53, 56, 56, 56, 57, 57, 59.

   Class 2 (23 scores): 22, 28, 31, 32, 33, 34, 34, 35, 36, 37, 39, 40, 40, 41, 43, 44, 45, 45, 50, 50, 50, 51, 56.

9. The following list gives the mass, in kilograms, of each child in Ms. Rathert's class. Construct a box-and-whisker plot for the data. Indicate any outliers with asterisks. Identify numbers that you used to construct the plot.
   31, 39, 39, 39, 40, 40, 41, 42, 42, 42, 42, 43, 43, 44, 45, 46, 47, 48, 49, 49, 49, 60

10. The following table shows fast food items that are high in salt.
    a. Draw a box-and-whisker plot for the data. Label the points used to make the plot.
    b. Is the median closer to the lower quartile or the upper quartile?
    c. Is the mean closer to the lower quartile or the upper quartile?
    d. Are there any outliers in the data? Explain.

Food item	Milligrams of salt
Fish sandwich	1018
Bacon sandwich	1180
Pancakes	1264
Ham biscuit	1415
Ham & Cheese sandwich	1550
Pasta Salad	1570
Chicken Salad	1582
Roast beef sandwich	1953
Fish & chips	2016

11. The following test scores are for two classes that took the same test. The highest possible score on the test was 60.

Class 1 (45 scores): 19, 19, 24, 24, 27, 34, 34, 35, 35, 38, 39, 39, 40, 40, 40, 41, 41, 42, 42, 43, 44, 44, 45, 45, 47, 48, 48, 49, 49, 50, 50, 50, 51, 51, 51, 53, 53, 53, 56, 56, 56, 56, 57, 57, 59.

Class 2 (42 scores): 22, 27, 28, 29, 31, 32, 32, 33, 33, 33, 34, 34, 35, 36, 36, 37, 38, 39, 40, 40, 40, 41, 41, 43, 43, 44, 44, 45, 45, 48, 48, 50, 50, 50, 50, 51, 51, 53, 56, 56, 56.

   a. Form a back-to-back ordered stem-and-leaf plot.

   b. Which class appears to have better performance? Support your answer.

12. The seventh-grade class voted to decide where to have their year-end picnic. Each student voted exactly once. The results were as follows: Mountain Park, 62 votes; State Beach, 96 votes; City Zoo, 82 votes. Draw a pie graph to illustrate this distribution.

13. For a certain group of people, the mean height is 182 cm, with a standard deviation of 11 cm.
    a. Anna's height is 170 cm. What is the z-score for her height?

    b. Juanita's height has a z-score of 1.4. What is her height?

14. Andy scored 20 on a math quiz. The mean score on the quiz was 16, and the standard deviation was 2.2. Andy scored 52 on another quiz, where the mean score was 48 and the standard deviation 3.1. Use z-scores to compare his performance on the two quizzes.

15. The following stem-and-leaf plot gives the weight in pounds of the students in the Algebra 1 class at East Junior High:

Weights of students in East Junior High Algebra 1 Class

7	2 4
8	1 1 2 5 7 8
9	2 4 7 8
10	3
11	
12	2 5

10 | 3 represents 103 lb

    a. How many students are represented?

    b. Write the weights of the students?

    c. What is the median weight of the students?

16. Draw a histogram based on the stem-and-leaf plot in the previous problem.

17. HKM Company employs 40 people of the following ages:

34	58	21	63	48	52	24	52	37	23
23	34	45	46	23	26	21	18	41	27
23	45	32	63	20	19	21	23	54	62
41	32	26	41	25	18	23	34	29	26

a. Draw an ordered stem-and-leaf plot for the data.

b. Are more employees in their 40s or in their 50s?

c. How many employees are less than 30 years old?

d. What percent of the people are 50 years or older?

e. Use the stem-and-leaf plot to find the median age. Explain how you used the plot to find the median.

18. The following table shows the grade distribution for the final examination in a math class.

Grade	**Frequency**
A	4
B	10
C	37
D	8
F	1

a. Draw a bar graph for the data.
b. List the central angle for each grade category that would be used in drawing a pie graph of the distribution.

19. The mean IQ score for 1500 students is 100, with a standard deviation of 15. Assuming the scores have a normal distribution, determine the following:
a. How many have an IQ between 85 and 115?

b. How many have an IQ between 70 and 130?

c. How many have an IQ over 145?

20. Calculate the standard deviation for the following set of data. Be sure to show all of your work!

17, 19, 19, 28, 30, 35

21. Sugar Plops boxes say they contain 16 oz of cereal. To make sure they do, the manufacturer fills the boxes to a mean weight of 16.1 oz, with a standard deviation of 0.05 oz. If the weights are distributed normally, what percent of the boxes actually contain 16 oz or more? What percent contain less than 16 oz?

22. A box contains seven tickets numbered 1 through 7. One ticket will be selected at random from the box.
    a. What are the elements of the sample space for this experiment?

    b. What is the probability of selecting an even number?

    c. What is the probability of selecting a number greater than 3?

    d. What is the probability of selecting a prime number?

    e. What is the probability of selecting a number less than 5?

    f. What is the probability of selecting an odd number?

23. A box contains 3 red balls, 5 black balls, and 4 white balls. Suppose one ball is drawn at random. Find the probability of each of the following events:

    a. A black ball is drawn.

    b. A black or a white ball is drawn

    c. Neither a black nor a white ball is drawn

    d. A red ball is not drawn

    e. A black ball and a white ball are drawn

    f. A black or a white or a red ball is drawn.

24. A chip is to be drawn from a box containing the following color chips: 3 blue, 4 red, and 5 yellow. Determine the probabilities of selecting the types of chips in the following:
    a. a red chip

    b. a blue or yellow chip

    c. a chip that is not blue

25. If you roll a pair of fair dice and add the numbers showing, what are the odds that you will roll a sum of seven or eleven?

26. Imagine an experiment in which letter cards that spelled **PROBABILITY** were mixed up in a box and one letter is selected at random.

P	R	O	B	A	B	I	L	I	T	Y

In the following questions, assume that the letter Y is not considered a vowel.
    a. What is the probability of selecting the letter B?

b. What is the probability of selecting a consonant?

c. What is the probability of selecting A or B?

d. What is the probability of selecting a vowel?

e. What is the probability of selecting a letter that is also a member of the set {C, X, Z}?

f. What is the probability of selecting a consonant or a vowel?

g. What is the probability of selecting a letter that is in the word MATERIAL or in the word SCIENTIFIC?

27. The probability that a certain surgical procedure will result in post-operative infection is reported at 28%. What are the odds of getting a post-operative infection from the procedure?

28. A deck of cards was thoroughly shuffled, and cards are being selected at random and then set aside. The last three cards chosen were the king of hearts, the queen of hearts and the jack of hearts. What are the odds that the next card selected is the ten of hearts?

29. What are the odds of flipping a fair coin and getting tails?

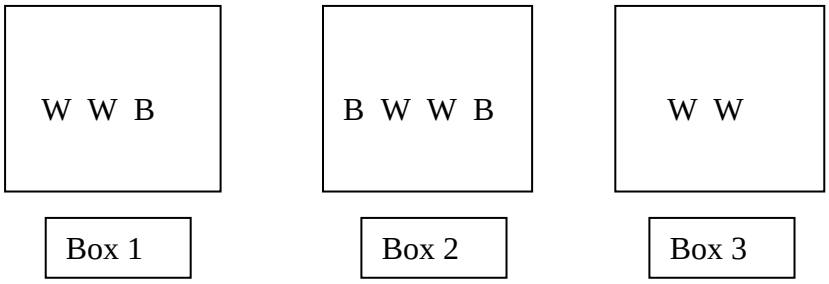
30. A box contains five colored balls and four white balls. Three balls are drawn one by one, without replacement.

a. Draw a tree diagram for the experiment.

b. Use your tree to find the probability that all three balls are white.

c. Find the probability that all three balls are white if they are drawn WITH replacement.

31. Consider the following boxes. Draw a letter from Box 1 and put it into Box 2, then draw a letter from Box 2 and put it into Box 3. Finally, draw a letter from Box 3.



a. Construct a tree diagram (showing the probabilities) for this experiment.

b. What is the probability that the last letter chosen is B?

c. What is the probability that the last letter chosen is W?

d. What is the probability that the letters chosen are WBW?