Chapter 3 Exam Review – Summarizing Univariate Data

MDM4U

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Section 3.1: Shapes of Distributions

1) Using the following data:

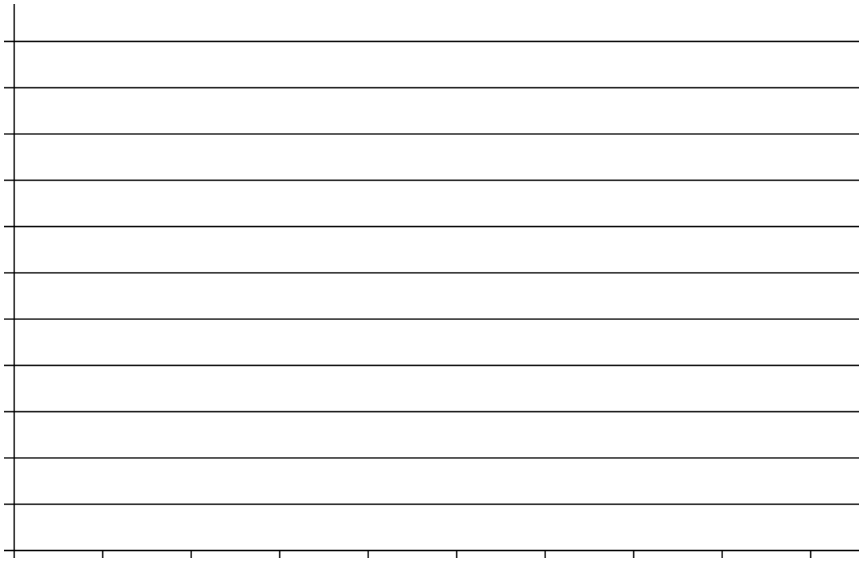
24, 25, 25, 25, 26, 27, 29, 30, 32, 32, 32, 32, 34, 34, 35, 36, 38, 39, 41, 43, 44, 45, 46, 47, 48, 49, 51, 54, 55, 57, 58, 60, 65

a) Calculate a bin width that would form six uniform intervals

b) Calculate the starting and end point for each of the five intervals. Then complete the frequency distribution.

Interval	Frequency

c) Create an appropriate histogram.



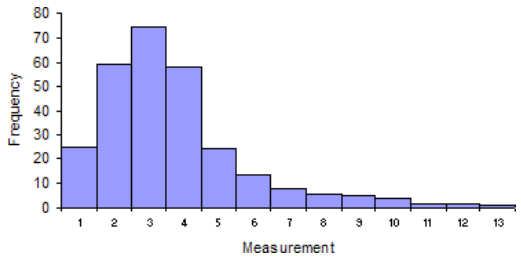
2) State the shape of distribution that occurs when the mean, median and mode are equal.

3) What shape of distribution occurs when the height of each bar is roughly equal?

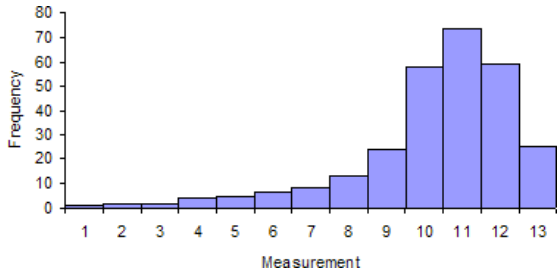
4) What shape of distribution occurs when there are peaks at both ends of the range?

5) What shape of distribution is represented in each of the following graphs?

a)



b)



Section 3.2/3.3: Measures of Central Tendency/Measures of Spread

6) The number of patients treated in a dental office on Mondays was recorded for 15 weeks.

5, 17, 28, 28, 28, 15, 13, 18, 10, 16, 20, 7, 20 22, 15

Use the above **sample** data to complete the chart below (you may use your graphing calculator).

Mean	**Mode**	Q_1	Q_2	Q_3	IQR	**Standard Deviation**

7) Listed below are the points scored in the 2009 playoffs for **all** 20 players on the Stanley Cup winning Pittsburgh Penguins.

0, 1, 1, 2, 4, 4, 5, 5, 6, 7, 7, 9, 9, 13, 14, 14, 14, 15, 31, 36

Use the above **population** data to complete the chart below (you may use your graphing calculator).

Mean	**Mode**	Q_1	Q_2	Q_3	IQR	**Standard Deviation**

8) Given the following distribution of mathematics marks on a test out of 25…

Score	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Frequency	1	1	2	0	4	2	3	3	4	6	3	4	4	1	2

Use your calculator to…

a) Calculate the population mean score on the test for the class.

b) Calculate the population standard deviation of the test scores.

9) A sample of 10 quiz marks of two students are compared.

Sue: 75, 59, 58, 72, 80, 66, 71, 79, 68, 55 Leopold: 90, 83, 55, 84, 72, 63, 50, 65, 52, 91

a) Which student has the higher sample average?

b) Which student gets the more consistent mark? (calculate the sample standard deviation)

10) You are taking a class in which your grade is determined from 5 sources: 15% from your homework, 30% from your quizzes (15% per quiz), 25% from your final exam, 15% from your culminating project, and 15% from your speech. Based on the following results, what is the weighted mean of your scores?

Source	Score, x	Weight, w	xw
Homework	80		
Quiz #1	85		
Quiz #2	76		
Project	95		
Speech	90		
Final Exam	84		

Mean:

11) The following data represent the salaries of a sample of employees at RIM Corporation

Salary (in thousands)	Frequency, f	Midpoint, m	$f \times m$
30---39	18		
40---49	15		
50---59	10		
60---69	5		
70---79	3		

Mean:

12) The middle 50% of the data surrounding the median is called the _____.

13) Jordan's term mark is 82. The term mark counts for 70% of the final mark. What mark must Jordan achieve on the final exam to earn a final mark of 75%?

Section 3.4: The Normal Distribution

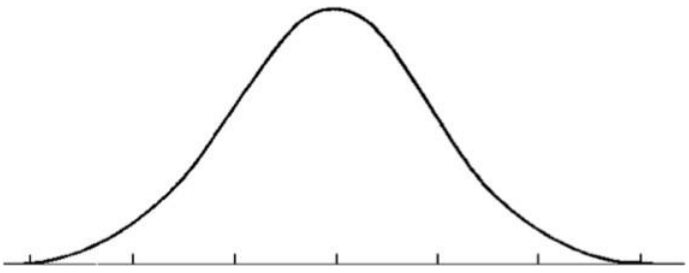
14) Fill in the blanks:

Normal distributions are symmetrical and approach _____ at the extremes. Of the data, _____% is within one standard deviation of the mean, _____% is within two standard deviations, and _____% is within three standard deviations of the mean. The area under any normal curve is _____.

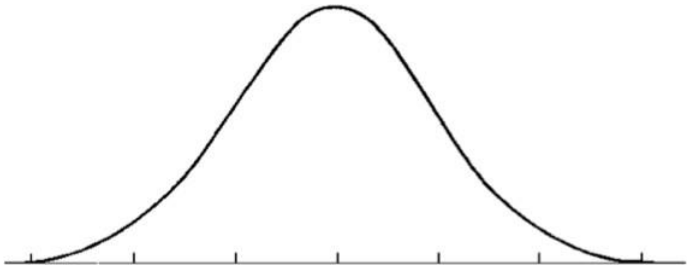
15) The temperatures in Florida for the month of December can be represented by the normal distribution $X \sim N(24, 4.8^2)$

a) What range of temperatures would you expect 68% of the days in December to fall between?

b) In what percent of the days will the temperature be between 19.2 and 24 degrees Celcius?



c) In what percent of the days will the temperature be greater than 14.4 degrees Celcius?



d) 99.7% of the days will be between what two temperatures?

e) Calculate the z-score for a temperature of 30 degrees Celsius. What does this z-score mean?

16) If the mass of children in Oakville were normally distributed, with a mean of 11.2 kg and a standard deviation of 2.8 kg, determine:

a) The percent of children with a mass less than or equal to 6.1 kg.

b) The percent of children with a mass between 7.3 kg and 14 kg.

c) The percent of children with a mass greater than 10.5 kg.

d) What percentile would a child weighing 15 kg be in?

17) Calculate the z---score, to two decimal places, of $x = 87.2$ if $\mu = 89.1$ and $\sigma = 3$

18) Suppose $X \sim N(50, 4^2)$. What value of x would have a z---score of 2.10?

19) In $X \sim N(12, 2^2)$, what percent of the data is between 10 and 13?

20) In $X \sim N(12, 2^2)$, what value of x corresonds to the 87^{th} percentile?

21) For the distribution $N(16, 3.5^2)$, determine the percent of the data that is within the given interval.

a) $X > 12$ **b)** $10 < X < 15$ **c)** $X < 18.7$

22) A group of students wrote an entrance Math exam and the scores were normally distributed. The mean score was 750 and there was a standard deviation of 95. If Johnny wants to score in the 94th percentile, what score must he get?

23) Mr. Jensen's Average golf score is 80 with a standard deviation of 3. In what percent of his golf rounds will he score less than 72?

24) The lengths of nails, in millimeters, at a certain plant are normally distributed with a mean of 20.00 and a standard deviation of 0.21. Nails produced will be rejected unless their lengths are between 19.71 mm and 20.42 mm. What percent of the nails are accepted?

25) The masses, in grams, of 750 packages of cheese are normally distributed. A package will be rejected if its z---score is ---2.57 or less. How many of these packages face rejection?