

## Learning Outcomes – MATH 10041 – Chapter 3

<b>Ch.</b>	<b>Sec.</b>	<b>Big idea</b>	<b>Learning outcomes – Conceptual</b>	<b>Learning Outcomes - Observable</b>
3	1	Numerical summaries for symmetric distributions	Use and interpret the mean and standard deviation for a set of numerical data; Understand the mean as a typical value; Understand the standard deviation as a “typical” distance from the mean of a symmetric, unimodal distribution.	Find the mean of a small data set by hand; Find the standard deviation of a small data set by hand; Use technology to find the mean and standard deviation of larger data sets; Interpret the mean of a distribution in context; Compare and interpret the means of two distributions in context; Interpret the standard deviation in context; Compare and interpret the standard deviations of two distributions in context.
	2	The Empirical Rule and standard scores	Know that the Empirical Rule provides a quick estimate of the spread of data in a unimodal, symmetric distribution given the mean and standard deviation; Recognize when the Empirical Rule does NOT apply; Be able to use and interpret the Empirical Rule in context.	Write, verbally state, and/or sketch a diagram of the Empirical Rule; Apply the Empirical Rule in context to determine the percent of a distribution that falls within given scores; Apply the Empirical Rule in context to determine the interval of scores falling within 1, 2, or 3 standard deviations of the mean; Given the mean and standard deviation of a unimodal, symmetric distribution and also given a value in that distribution, calculate its standard score by hand; Given the mean and standard deviation of a unimodal, symmetric distribution and also given a standard score, find by hand the value associated with that standard score; Given two values in a unimodal and symmetric distribution, use standard score to determine which is more unusual.
	3	Summaries for Skewed Distributions	Given a distribution, be able to determine which measure of center and spread is appropriate; Know and be able to use the measures of center and spread that are appropriate for skewed distributions.	Find by hand and with technology the median of a skewed distribution, then interpret it in context; Find, by hand and with technology, the IQR of a skewed distribution, then interpret it in context.
	4	Comparing Measures of Center	Understand the effect of outliers on measures of center.	Determine the appropriate descriptive measures to compare two numerical distributions; Give an example to show that the mean of a distribution is affected by outliers, but the median is not; Know when to separate a distribution into two groups for comparison.

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5	Boxplots and the five number summary	Using five number summaries and boxplots to describe shape, center, and spread of skewed distributions and to compare the characteristics of two or more distributions.	Obtain the five number summary of a distribution by hand; Use technology to find the 5-number summary; Given the five number summary of a numerical distribution, describe the shape, center, and spread of the distribution; Construct a boxplot by hand and by using technology; Use boxplots and quartiles to describe the shape, center, and spread of a distribution in context; Use boxplots to compare the characteristics of two or more distributions in context; Identify potential outliers of a distribution; Given histograms and boxplot of the same distributions, match a boxplot with its corresponding histogram and vice versa.
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