

Vanguard University
School for Professional Studies
Degree Program

“MATH FOR STATISTICS”
MATH #109

Student Guide

07/08
v1.4
TF 12/10

CATALOG DESCRIPTION

This course prepares students to understand the mathematical and statistical concepts in number sets, problem solving, ratios and proportions, percentages, sets and logic, probability and statistics, including frequency of distribution, statistical graphs, measures of central tendency, and measures of position and dispersion. The course includes a brief overview of number sense and algebra concepts in its overall design to introduce students to common mathematical skills necessary for coursework in statistics. (meets Natural Science/Math requirement)

TEXTS AND MATERIALS

Required text and calculator:

*Blitzer, R. (2008). *Thinking Mathematically* (5th Edition). Upper Saddle River, New Jersey: Prentice Hall (Pearson). ISBN: 0321645855

***Calculator** with basic scientific mathematical functions (addition, subtraction, multiplication, division, square root, etc). For example, TI-30XIIS is sufficient.

LEARNING OUTCOMES

At the conclusion of this class, students will learn to:

- 1) categorize and manipulate large quantities of data, providing the essential tools to organize, interpret and analyze such data,
 - 2) to understand the concept of probability and apply the concept to problem solving,
 - 3) to develop and use critical thinking skills through finding solutions to real-world situations,
 - 4) to understand number sense and critical algebra concepts,
 - 5) to comprehend ratio, proportion, and percentage and use the concepts in solving problems
 - 6) to use inductive and deductive reasoning to draw logical conclusions,
- to problem solve using mathematical concepts to bring different variables together to devise optimal solutions to everyday life situations.

Objectives for this course are related to the overall Educational Targets and Goals of Vanguard University of Southern California, which include Intellectual Engagement and Professional Excellence.

COURSE POLICIES

ATTENDANCE POLICY

Because each course meets only five to eight times, it is important that students not miss class unless it is unavoidable. To receive the full participation points students must arrive on time to class with a working knowledge of each sessions assignments and they must actively engage in class discussions.

Students who miss more than five class hours in any given course will automatically receive a failing grade and need to retake the course to obtain a passing grade. If an instructor deems that a student's absence, beyond the 5 hours was under extremely unavoidable and unusual circumstances (i.e. hospitalization, death in the family, major auto accident), the professor may file an academic petition on behalf of the student to the Program Chair. If the academic petition is approved, the instructor may give the student a "W" (Withdrawal) grade in place of a failing grade. The student will be required to re-take the course.

Students who miss the first two class sessions, or the first five hours of a course, will automatically be dropped and be required to retake the course.

ACADEMIC DISHONESTY (incl. Plagiarism)

Academic dishonesty, either cheating or plagiarism (presenting the words or opinions of others as one's own work), is regarded as a serious violation of both the academic and moral standards of Vanguard University. Dishonesty in any class assignment can result in: loss of credit for the assignment, loss of credit for the entire course, and referral to the Director and/or Provost. It is the prerogative and responsibility of the instructor to determine if academic dishonesty has occurred and the seriousness of the infraction. The Office of the Provost is to be notified of instances of academic dishonesty.

A student commits plagiarism if he/she submits as his/her own work:

1. Part or all of an assignment copied from another person's assignments, notes, or computer file.
2. Part or all of an assignment copied or paraphrased from a book, magazine, pamphlet, or website.
3. A sequence of ideas transferred from another source which the student has digested, integrated, and reorganized, and for which he/she fails to give proper acknowledgement.

A student is an accomplice in plagiarism if he/she

1. Allows his/her paper or other assignments, in outline or finished form, to be copied and submitted as the work of another.
2. Lends his/her computer disk to another student or otherwise allows his/her computer files to be copied for the purposes of plagiarism.
3. Prepares a written assignment for another student and allows it to be submitted as another's work.

DISABILITY SERVICES

For students with documented medical or psychological disabilities, please contact the Coordinator of Disability Services to request reasonable accommodations. The Coordinator of Disability Services is located in the Counseling Center on the second floor of the Scott Academic Center and can be reached at extension 4489 or by email at disabilityservices@vanguard.edu

For students with a documented learning disability who would like to request appropriate accommodations, please contact the Director of Learning Skills, located upstairs in Scott Academic Center at extension 2540 or by email at disabilityservices@vanguard.edu

DIVERSITY STATEMENT

The School for Professional Studies intends to foster a Christ-centered community that promotes appreciation and respect for individuals, enhances the potential of all members, and values differences in gender, race, abilities, and generation. As such, we endeavor to communicate with honesty, to speak with encouraging and edifying words, and to create a safe environment in our classes and interactions.

GRADED HOMEWORK/ASSIGNMENTS

If an instructor chooses to submit graded papers or assignments to the SPS office, students may pick-up their work at the SPS Office Front Desk. Graded work is not kept 5 weeks beyond the last class session. Please note: the SPS office is not responsible for unclaimed or lost papers or assignments.

If a student chooses to submit their paper or assignment to the SPS office, this must be arranged between the instructor and student prior to submission. The SPS Office will gladly forward the completed paper or assignment to the instructor, however the SPS office is not responsible for unclaimed or lost papers or assignments.

LATE WORK

No late work is accepted. Exceptions may be made between the instructor and student.

STUDENT EVALUATION

Assignments are listed in the weekly outline. Students are expected to read the definitions, terms, laws, formulas, theorems and/or properties in each of the required sections before coming to class. The text contains several “in your own words” questions and problems. Students should attempt to understand and answer these. If students have questions of any of these items, time will be given in class for discussion. Class time will provide opportunities to discuss questions that may arise from the reading or assignments. Completed assignments are due on the week that they are assigned.

Assignments/Homework: Students must read through each assignment and complete it prior to the start of each class. Students will be graded both on accuracy and completion of each assignment. All homework assignments must be done in *“pencil”* only.

Weekly Quizzes: Regular review of mathematical and logical concepts is critical in the development and understanding of the subject matter. Chapter or sectional quizzes will be given during Weeks 2, 3, 5, and 6.

Exams: A mid-term exam will be given week 4 and a final exam on week 7.

Categories will be weighted as follows

Homework	15%
Attendance	10%
Quizzes	25%
Mid-Term	25%
Final	25%

Students in this course will be evaluated by the University’s 4.0 grading system. You should refer to the University’s Student Handbook for further details on the grading system.

<u>Percentages</u>	<u>Grade</u>	<u>Significance</u>	<u>GPA</u>
93-100%	A	Exceptional	4.00
90-92.9%	A-		3.67
87-89.9%	B+		3.33
83-86.9%	B	Above Average	3.00
80-82.9%	B-		2.67
77-79.9%	C+	Average	2.33
73-76.9%	C		2.00
70-72.9%	C-		1.67
67-69.9%	D+		1.33
63-66.9%	D	Below Average	1.00
60-62.9%	D-		0.67
00-59.9%	F	Failure	0.00

STUDENT ASSIGNMENTS**DUE WEEK ONE**

- Read text chapter 1.1 – 1.3
- Complete Basic Math Review Problems #1-33

DUE WEEK TWO

- Section 1.1 pages 9-11; #3-36 (multiples of 3) [i.e., 3, 6, 9, etc.] and 57-60, 62
- Section 1.2 pages 22-25; #3-42 (multiples of 3) and 71-75
- Section 1.3 pages 33-35; #3-33 (multiples of 3) and 56-64
- Prepare for Quiz #1 on Chapter 1.1-1.3
- Read text chapter 6.1 – 6.3

DUE WEEK THREE

- Section 6.1 pages 314-316 #5-65 (multiples of 5) [i.e., 5, 10, 15, etc.] and 84-96
- Section 6.2 pages 328-331; #5-70 (multiples of 5) and 97, 99, 101, 103, 122, 131
- Section 6.3 pages 338-341; #3-33 (multiples of 3) and #75
- Prepare for Quiz #2 on Chapter 6.1 – 6.3
- Read text chapter 8.1 – 8.3

DUE WEEK FOUR

- Section 8.1 page 452-453 #3-66 (multiples of 3)
- Section 8.2 pages 458-459 #3-42 (multiples of 3)
- Section 8.3 pages 466-468 #3-30 (multiples of 3) and 41, 69
- Prepare for Midterm Exam on Chapters 1, 6, 8
- Read text chapter 11.1 – 11.4

DUE WEEK FIVE

- Section 11.1 pages 606-607 #3-21 (multiples of 3)
- Section 11.2 pages 613-615 #5-50 (multiples of 5)
- Section 11.3 pages 619-621 #3-39 (multiples of 3) and 48, 53, 55
- Section 11.4 pages 627-629 #5-50 (multiples of 5) and 61, 63
- Prepare for Quiz #3 on Chapter 11.1 – 11.4
- Read text chapter 12.1 – 12.3

DUE WEEK SIX

- Section 12.1 pages 683-686 #3-15 (multiples of 3) and 32
- Section 12.2 pages 696-699 #3-48 (multiples of 3) and 50, 56, 59
- Section 12.3 pages 705-707 #3-30 (multiples of 3)
- Prepare for Quiz #4 on Chapter 12.1 - 12.3
- Read text chapters 12.4 – 12.5

DUE WEEK SEVEN

- Section 12.4 pages 717-719 #3-48 (multiples of 3, and 67
- Section 12.5 pages 724-725 #3-36 (multiples of 3) and 44, 45

- Prepare for Final exam on chapters 11.1-11.4 and 12.1-12.5

WEEK ONE: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 1).

Assignment: Due Class Session #1. Complete each of the problems (#1-33 all) on the following *Basic Math Review Assignment* **prior** to coming to the first class session (Week 1). Complete the problems on a *separate sheet* of paper. Since this review is an assessment exercise, please attempt each problem on your own without help from any outside source or person.

DO NOT work any of the problems from Chapter 1 – **work only the *Basic Math Review* problems (#1-33)** assigned for the first class session (the Assessment assignment is located on the next two pages of this guide).

WEEK ONE ASSIGNMENT MATH 109

Basic Mathematics Review

Directions: Complete the following problems on a separate sheet of paper **prior** to the first class session. Since this review is an assessment exercise, please attempt each problem on your own without help from any outside source or person.

A. Symbols and Order of Operation

1. $2 + 5 \times 7 = ?$

2. $(2 + 5) \times 7 = ?$

3. $3 \times 4 + 2 \times 5 = ?$

4. $3 \times (4 + 2) \times 5 = ?$

5. $4 + 2^2 - 1 = ?$

6. $(4 + 2)^2 - 1 = ?$

7. $12 \div 3 + 1 = ?$

8. $12 \div (3 + 1) = ?$

B. Proportions, Fractions, Decimals, and Percentages

9. Express $\frac{14}{80}$ as a decimal.

10. Convert $\frac{14}{40}$ to a percentage.

11. Convert 18% to a fraction.

12. $\frac{4}{5} \times \frac{2}{3} = ?$

13. $\frac{7}{12} \times \frac{5}{6} = ?$

14. $\frac{1}{8} + \frac{4}{6} = ?$

15. $7.833 + 0.67 = ?$

16. A company reports that three-eighths of its employees are women. If there are 56 employees, how many are women?

C. Negative and Positive Numbers

17. $5 \times (-4) = ?$
18. $4 + (-2) - 5 - (-3) = ?$
19. $-5 - (-4) = ?$
20. $(-7) \times (-6) = ?$
21. $-75 \div (-5) = ?$
22. $-7(5)(-1) = ?$

D. Basic Algebra and Equations

Solve for X.

23. $X + 7 = 13$
24. $11 = X + 3$
25. $\frac{X}{4} = 36$
26. $3X - 6 = -18$
27. $\frac{X + 3}{2} = 14$

E. Exponents and Square Roots

28. $4^3 = ?$
29. $(-2)^4$
30. If $a = 4$ and $b = -2$, then $a^2 b^3 = ?$
31. $\frac{49}{\sqrt{49}} = ?$

32. If $a = 9$ and $b = 25$, then $\sqrt{a+b} = ?$

33. $(4 + 5)^2 - \sqrt{81} = ?$

WEEK ONE IN-CLASS FOCUS

KEY CONCEPTS: CHAPTER 1

Description and Content

1.1 – 1.3 Chapter One: Problem Solving and Critical Thinking

1.1 Inductive and Deductive Reasoning

Inductive reasoning is the process of arriving at a probable conclusion based on observations of specific examples. The conclusion is called a conjecture or a hypothesis.

A case for which a conjecture is false is called a counterexample.

Deductive reasoning is the process of proving a specific conclusion from one or more general statements. The statement that is proved is called a theorem.

1.2 Estimations and Graphs

Estimation is the process of arriving at an approximate answer to a question. The symbol \approx means *is approximately equal to*.

Estimation is useful when interpreting information given in circle, bar, and line graphs.

1.3 Problem Solving

Understand the problem.

Devise a plan.

Carry out the plan and solve the problem.

Look back and check the answer.

Assignment for Week 2:

- **Section 1.1** pages 9-11; #3-36 (every 3rd problem) **and** 57-60, 62
- **Section 1.2** pages 22-25; #3-42 (every 3rd problem) **and** 71-75
- **Section 1.3:** pages 33-35; #3-33 (every 3rd problem) **and** 56-64
- **Prepare for Quiz #1: Chapter 1.1 – 1.3**
- **Read Chapter 6.1 – 6.3**

WEEK TWO: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 2).

Chapter One: Problem Solving and Critical Thinking

Assignment for week 2:

- **Section 1.1:** pages 9-11; #3-36 (every 3rd problem) [i.e., 3, 6, 9, etc.;] **and** 57-60, 62
- **Section 1.2:** pages 22-25; #3-42 (every 3rd problem) **and** 71-75
- **Section 1.3:** pages 33-35; #3-33 (every 3rd problem) **and** 56-64
- **Prepare for Quiz #1: Chapter 1.1 – 1.3**
- **Read Chapter 6.1 – 6.3**

WEEK TWO IN-CLASS FOCUS

KEY CONCEPTS: CHAPTER 6

Section 6.1 on Algebraic Expressions and Formulas

- a. An algebraic expression combines variables and numbers using addition, subtraction, multiplication, division, powers, or roots.
- b. Evaluating an algebraic expression means finding its value for a given value of the variable.
- c. Terms of an algebraic expression are separated by addition. Like terms have the same variable with the same exponents on the variables. To add or subtract like terms, add or subtract the coefficients and copy the common variable.
- d. An algebraic expression is simplified when parentheses have been removed (using the distributive property) and like terms have been combined.
- e. Formulas are statements of equality expressing a relationship among two or more variables. Formulas that approximately describe data are called mathematical models.

Section 6.2 on Linear Equations in One Variable

- a. A linear equation in one variable can be written in the form $ax + b = c$. The greatest exponent on the variable is 1.

- b. Solving a linear equation is the process of finding the set of numbers that will make the equation a true statement. These numbers are the solutions.
- c. A step-by-step procedure for solving a linear equation is given in the box on page 319.
- d. If an equation contains fractions, multiply each term of the equation by the least common denominator of the fractions in the equation, thereby clearing the fractions.
- e. If a false statement (such as $-6 = 7$) is obtained in solving an equation, the equation has no solution. The solution set is \emptyset , the empty set.
- f. If a true statement (such as $-6 = -6$) is obtained, the equation has infinitely many solutions. The solution set is the set of all real numbers.
- g. The ratio of a to b is written $\frac{a}{b}$, or $a:b$.
- h. A proportion is a statement in the form $\frac{a}{b} = \frac{c}{d}$.
- i. The cross-products principle states that if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.
- j. A step-by-step procedure for solving applied problems using proportions is given in the box on page 326.

Section 6.3 on Applications of Linear Equations

- a. A step-by-step strategy for solving word problems using linear equations is given in the box on page 332.
- b. Algebraic translations of English phrases are given in Table 6.2 on page 332.

ASSIGNMENT DUE WEEK THREE

- **Section 6.1** Algebraic Expressions and Formulas, pages 308-316
Assignment pages 314-316; #5-65 (every 5th problem) **and** 84-96
- **Section 6.2** Linear equations in One Variable, pages 317-331
Assignment pages 328-331; #5-70 (every 5th prob.) **and** 97, 99, 101, 103, 122, 131
- **Section 6.3** Applications of Linear Equations, pages 331-341
Assignment: pages 338-341; #3-33 (every 3rd problem)) **and** 75
- **Prepare for Quiz #2 on Chapter 6.1 – 6.3**
- **Read Chapter 8.1 – 8.3**

WEEK THREE: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 3).

ASSIGNMENT DUE WEEK THREE

- **Section 6.1** Algebraic Expressions and Formulas, pages 308-316
Assignment pages 314-316; #5-65 (every 5th problem) **and** 84-96
- **Section 6.2** Linear equations in One Variable, pages 317-331
Assignment pages 328-331; #5-70 (every 5th prob.) **and** 97, 99, 101, 103, 122, 131
- **Section 6.3** Applications of Linear Equations, pages 331-341
Assignment: pages 338-341; #3-33 (every 3rd problem) **and** 75
- **Prepare for Quiz #2 on Chapter 6.1 – 6.3**
- **Read Chapter 8.1 – 8.3**

WEEK THREE IN-CLASS FOCUS KEY CONCEPTS: CHAPTER 8

8.1 Percent, Sales Tax, and Income Tax

- a. Percent means per hundred. Thus, $97\% = \frac{97}{100}$.
- b. To express a fraction as a percent, divide the numerator by the denominator, move the decimal point in the quotient two places to the right, and add a percent sign.
- c. To express a decimal number as a percent, move the decimal point two places to the right and add a percent sign.
- d. To express a percent as a decimal number, move the decimal point two places to the left and remove the percent sign.
- e. The percent formula, $A = PB$, means A is P percent of B .
- f. Sales tax amount = tax rate \times item's cost

- g. Discount amount = discount rate \times original price
- h. The fraction for percent increase (or decrease) is

$$\frac{\text{Amount of increase (or decrease)}}{\text{Original amount}}$$

Find the percent increase (or decrease) by expressing the fraction as a percent.

8.2 Simple Interest

- a. Interest is the price we are paid for lending money or pay for borrowing money. The amount deposited or borrowed is the principal. The charge for interest, given as a percent, is the rate, assumed to be per year.
- b. Simple interest involves interest calculated only on the principal and is computed using $I = Prt$.
- c. The future value, A , of P dollars at simple interest rate r for t years is $A = P(1 + rt)$.
- d. Discounted loans deduct the interest, called the discount, from the loan amount at the time the loan is made.

8.3 Compound Interest

- a. Compound interest involves interest computed on the original principal as well as on any accumulated interest. The amount in an account for one compounding period per year is $A = P(1 + r)^t$. For n compoundings per year, the amount is $A = P\left(1 + \frac{r}{n}\right)^{nt}$.
- b. Calculating Present Value
If A dollars are to be accumulated in t years in an account that pays rate r compounded n times per year, then the present value, P , that needs to be invested now is given by
- $$P = \frac{A}{\left(1 + \frac{r}{n}\right)^{nt}}$$
- c. Effective Annual Yield
Effective annual yield is defined in the box on page 464. The effective annual yield, Y , for an account that pays rate r compounded n times per year is given by

$$Y = \left(1 + \frac{r}{n}\right)^n - 1.$$

Review for Mid-Term Exam (Chapters 1, 6, and 8)

- REVIEW PRACTICE FOR CHAPTER 1 (**Suggested: not required**)
 - Chapter 1 Test, pages 41-42
- REVIEW PRACTICE FOR CHAPTER 6 (**Suggested: not required**)
 - Chapter 6 Test, page 367-368
- REVIEW PRACTICE FOR CHAPTER 8 (**Suggested: not required**)
 - Chapter 8 Test, page 499-500

ASSIGNMENT DUE WEEK FOUR

- **Section 8.1** Percent, pages 443-452
Assignment: page 452-453 #3-66 (every 3rd problem)
- **Section 8.2** Simple Interest, pages 454-458
Assignment: pages 458-459 #3-42 (every 3rd problem))
- **Section 8.3** Compound Interest, pages 460-465
Assignment: pages 466-468 #3-30 (every 3rd problem) **and** 41, 69
- **Prepare for Midterm Exam on Chapters 1, 6, 8**
- **Read Chapter 11.1 – 11.4**

WEEK FOUR: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 4).

Chapter Eight: Consumer Mathematics and Financial Management

ASSIGNMENT DUE WEEK FOUR

- **Section 8.1** Percent, pages 443-452
Assignment: page 452-453 #3-66 (every 3rd problem)
- **Section 8.2** Simple Interest, pages 454-458
Assignment: pages 458-459 #3-42 (every 3rd problem))
- **Section 8.3** Compound Interest, pages 460-465
Assignment: pages 466-468 #3-30 (every 3rd problem) **and** 41, 69
- **Prepare for Midterm Exam on Chapters 1, 6, 8**
- **Read Chapter 11.1 – 11.4**

WEEK FOUR IN-CLASS FOCUS

MIDTERM EXAM and KEY CONCEPTS: CHAPTER 11

Midterm Exam on Chapters 1, 6, 8

11.1 The Fundamental Counting Principle

The number of ways in which a series of successive things can occur is found by multiplying the number of ways in which each thing can occur.

11.2 Permutations

- a. A permutation from a group of items occurs when no item is used more than once and the order of arrangement makes a difference.
- b. Factorial Notation

$$n! = n(n - 1)(n - 2)\dots(3)(2)(1) \text{ and } 0! = 1$$
- c. Permutations Formula

The number of permutations possible if r items are taken from n items is

$${}_n P_r = \frac{n!}{(n-r)!}$$

d. Permutations of Duplicate Items

The number of permutations of n items, where p items are identical, q items are identical, r items are identical, and so on, is $\frac{n!}{p!q!r!\dots}$

$$\frac{n!}{p!q!r!\dots}$$

Combinations

a. A combination from a group of items occurs when no item is used more than once and the order of items makes no difference.

b. Combinations Formula

The number of combinations possible if r items are taken from n items is

$${}_n C_r = \frac{n!}{(n-r)!r!}$$

11.3 Fundamentals of Probability

a. Theoretical probability applies to experiments in which the set of all equally-likely outcomes, called the sample space, is known. An event is any subset of the sample space.

b. The theoretical probability of event E with sample space S is

$$P(E) = \frac{\text{number of outcomes in } E}{\text{total number of possible outcomes}} = \frac{n(E)}{n(S)}$$

c. Empirical probability applies to situations in which we observe the frequency of the occurrence of an event.

d. The empirical probability of event E is

$$P(E) = \frac{\text{observed number of times } E \text{ occurs}}{\text{total number of observed occurrences}}$$

ASSIGNMENT DUE WEEK FIVE

- **Section 11.1** The Fundamental Counting Principle, pages 602-607
Assignment: page 606-607 #3-21 (every 3rd problem)
- **Section 11.2** Permutations, pages 608-615
Assignment: pages 613-615 #5-50 (every 5th problem)
- **Section 11.3** Combinations, pages 615-621
Assignment: page 619-621 #3-39(every 3rd problem); **and** 48, 53, 55
- **Section 11.4** Fundamentals of Probability, pages 621-629

- Assignment:** pages 627-629 #5-50 (every 5th problem) **and** 61, 63
- **Prepare for Quiz #4 on Chapter 11.1 – 11.4**
 - **Read Chapter 12.1 – 12.3**

WEEK FIVE: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 5).

Chapter Eleven: Fundamentals of Probability

ASSIGNMENT DUE WEEK FIVE

- **Section 11.1** The Fundamental Counting Principle, pages 602-607
Assignment: page 606-607 #3-21 (every 3rd problem) [i.e., 3, 6, 9, 12, etc.]
- **Section 11.2** Permutations, pages 608-615
Assignment: pages 613-615 #5-50 (every 5th problem) [i.e., 5, 10, 15, 20, etc.]
- **Section 11.3** Combinations, pages 615-621
Assignment: page 619-621 #3-39 (every 3rd problem); **and** 48, 53, 55
- **Section 11.4** Fundamentals of Probability, pages 621-629
Assignment: pages 627-629 #5-50 (every 5th problem) **and** 61, 63
- **Prepare for Quiz #3 on Chapter 11.1 – 11.4**
- **Read Chapter 12.1 – 12.3**

WEEK FIVE IN-CLASS FOCUS

KEY CONCEPTS: CHAPTER 12 Sections 12.1 to 12.3

12.1 Sampling, Frequency Distributions, and Graphs

- A population is the set containing all objects whose properties are to be described and analyzed. A sample is a subset of the population.
- Random samples are obtained in such a way that each member of the population has an equal chance of being selected.
- Data can be organized and presented in frequency distributions, grouped frequency distributions, histograms, frequency polygons, and stem-and-leaf plots.

12.2 Measures of Central Tendency

- The mean is the sum of the data items divided by the number of items.

$$\text{Mean} = \frac{\sum x}{n}$$

- The mean of a frequency distribution is computed using

$$\text{Mean} = \frac{\sum xf}{n}$$

where x is each data value, f is its frequency, and n is the total frequency of the distribution.

- c. The median of ranked data is the item in the middle or the mean of the two middlemost items. The median is the value in the $\frac{n+1}{2}$ position in the list of ranked data.
- d. The mode of a data set is the value that occurs most often. If there is no such value, there is no mode. If more than one data value has the highest frequency, then each of these data values is a mode.
- e. The midrange is computed using
- $$\frac{\text{lowest data value} + \text{highest data value}}{2}$$

12.3 Measures of Dispersion

- a. Range = highest data value – lowest data value
- b. Standard deviation = $\sqrt{\frac{\sum (\text{dataitem} - \text{mean})^2}{n - 1}}$
- c. As the spread of data items increases, the standard deviation gets larger.

ASSIGNMENT DUE WEEK SIX

- **Section 12.1** Sampling, Frequency Distributions, and Graphs, pages 674-686
Assignment: pages 683-686 #3-15 (every 3rd problem), and 32
- **Section 12.2** Measures of Central Tendency, pages 687-699
Assignment: pages 696-699 #3-48 (every 3rd problem) **and** 50, 56, 59
- **Section 12.3** Measures of Dispersion, pages 699-707
Assignment: pages 705-707 ##3-30 (every 3rd problem)
- **Prepare for Quiz #4 on Chapter 12.1 – 12.3**
- **Read Chapter 12.4 – 12.5**

WEEK SIX: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 6).

Chapter Twelve: Statistics

ASSIGNMENT DUE WEEK SIX

- **Section 12.1** Sampling, Frequency Distributions, and Graphs, pages 674-686
Assignment: pages 683-686 #3-15 (every 3rd problem), and 32
- **Section 12.2** Measures of Central Tendency, pages 687-699
Assignment: pages 696-699 #3-48 (every 3rd problem) **and** 50, 56, 59
- **Section 12.3** Measures of Dispersion, pages 699-707
Assignment: pages 705-707 ##3-30 (every 3rd problem)
- **Prepare for Quiz #4 on Chapter 12.1 – 12.3**
- **Read Chapter 12.4 – 12.5**

WEEK SIX IN-CLASS FOCUS **KEY CONCEPTS: CHAPTER 12 Sections 12.4 – 12.5**

12.4 The Normal Distribution

- a. The mean, median and mode of a normal distribution are all equal.
- b. The 68-95-99.7 Rule for the Normal Distribution:
 - a. Approximately 68% of the data items fall within 1 standard deviation of the mean (in both directions).
 - b. Approximately 95% of the data items fall within 2 standard deviations of the mean (in both directions).
 - c. Approximately 99.7% of the data items fall within 3 standard deviations of the mean (in both directions).
- c. A z-score describes how many standard deviations a data item in a normal distribution lies above or below the mean. The z-score can be obtained using:

$$z\text{-score} = \frac{\text{data item} - \text{mean}}{\text{standard deviation}}$$

Data items above the mean have positive z-scores and data items below the mean have negative z-scores. The z-score for the mean is zero.

- d. If $n\%$ of the items in a distribution are less than a particular data item, we say that the data item is in the n th percentile of the distribution.
- e. If a statistic is obtained from a random sample of size n , there is a 95% probability that it lies within $(1/\sqrt{n}) * 100\%$ of the true population percent where $\pm (1/\sqrt{n}) * 100\%$ is called the margin error.

12.5 Problem Solving with the Normal Distribution

- a. To find the percentage of data items between two given items in a normal distribution:
 - i. Convert each given data item to a z-score:
 - i. $z\text{-score} = \frac{\text{data item} - \text{mean}}{\text{standard deviation}}$
 - ii. Use Table 12.14 to find the percentile corresponding to each z-score in step 1.
 - iii. Subtract the lesser percentile from the greater percentile and attach a % sign.

ASSIGNMENT DUE WEEK SEVEN

- **Section 12.4** The Normal Distributions, pages 707-719
Assignment: pages 717-719 #3-48 (every 3rd problem), **and** 67
- **Section 12.5** Problems Solving with the Normal Distribution, pages 720-725
Assignment: pages 724-725 #3-36 (every 3rd problem) **and** 44, 45
- **Prepare for Final Exam on Chapters 11.1 – 11.4 and 12.1 – 12.5**

REVIEW PRACTICE (Suggested: not required):

- Chapter 11 Summary & Review Exercises Sections 1-4 only
- Chapter 12 Summary & Review Exercises Sections 1-5 only

WEEK SEVEN: Assignment and In-Class Focus

The following assignments indicated below are **DUE** for **THIS CLASS** session (Week 7).

Chapter Twelve: Statistics

ASSIGNMENT DUE WEEK SEVEN

- **Section 12.4** The Normal Distributions, pages 707-719
Assignment: pages 717-719 #3-48 (every 3rd problem), **and** 67
- **Section 12.5** Problems Solving with the Normal Distribution, pages 720-725
Assignment: pages 724-725 #3-36 (every 3rd problem) **and** 44, 45
- **Prepare for Final Exam on Chapters 11.1 – 11.4 and 12.1 – 12.5**

Final Exam (Chapters 11 and 12)

The final exam will cover material from Chapters 11.1 – 11.4 and 12.1 – 12.5

LOGISTICS CHART

Week	Hour 1	Hour 2	Hour 3	Hour 4
1	Introductions Course expectations <i>Review:</i> Basic Math Review Exam	<u>Chapter 1</u> SECTION 1.1	<i>BREAK</i> SECTION 1.2	SECTION 1.3
2	Correct and review Chapter 1 QUIZ #1 Chapter One	<u>Chapter 6</u> SECTION 6.1	<i>BREAK</i> SECTION 6.2 SECTION 6.3	SECTION 6.4
3	Correct and review Chapter 6 QUIZ #2 Chapter Six	<u>Chapter 8</u> SECTION 8.1	<i>BREAK</i> SECTION 8.2	SECTION 8.3
4	Correct and review Chapter 8 MID-TERM EXAM	MID-TERM EXAM	<i>BREAK</i> <u>Chapter 11</u> SECTION 11.1 SECTION 11.2	SECTION 11.3 SECTION 11.4
5	Correct and review Chapter 11 QUIZ #3 Chapter Eleven	<u>Chapter 12</u> SECTION 12.1	<i>BREAK</i> SECTION 12.2	SECTION 12.3
6	Correct and review Chapter 12.1-12.3	QUIZ #4 Chapter 12.1-12.3	<i>BREAK</i> <u>Chapter 12</u> SECTION 12.4	SECTION 12.5
7	Correct and review Chapter 12.4-12.6 <i>Review:</i> CHAPTER 11	<i>Review:</i> CHAPTER 12	<i>BREAK</i> FINAL EXAM	FINAL EXAM