Interactive Statistics 3/e

By Michael Sullivan, III and George Woodbury

Preface to the Instructor

Capturing a Powerful and Exciting Discipline

Statistics is a powerful subject. Technology has changed the way the material is disseminated to the student, and, because of this, statistics education continues to evolve. *Interactive Statistics: Informed Decisions Using Data* 3e is one of the new and innovative tools that you may use to help your students learn and appreciate the power of Statistics. How? By presenting information through video, interactive explorations, and text.

Today's traditional-aged students have grown up with technology - they do not fear it but embrace and demand innovative technology. Today's non-traditional students did not grow up with technology and relied on textbooks exclusively for content knowledge. Therefore, digital texts are something they may not be completely comfortable with. Yet, all students need to be exposed to the latest techniques in delivering intellectual content. This product provides such an opportunity. A traditional book delivers examples via text (sometimes very dense text). Certainly, the ability to read material and understand the content is a vital skill to develop. However, much information in today's world is delivered via video and other media. *Interactive Statistics* presents material using a balanced approach of delivering content through both text and video, with the video embedded into the text. And we don't stop with video as the only media. Students learn best through experiential learning. So, there are applet activities also embedded into the text to help students discover concepts. To confirm that students watch the videos or work through the activities, there are short assessment questions written in MyLab that are tied to the MyLab gradebook following these media assignments.

The content in *Interactive Statistics: Informed Decisions Using Data* 3e is delivered entirely online through Interactive Assignments complete with videos, interactive activities, and exercises in one seamless learning experience. Instructors and students also have access to the eText which is a read-only version that contains everything within the Interactive Assignment except for the MathXL exercises. Both versions also have an extensive chapter review that will assist your students in preparing for exams.

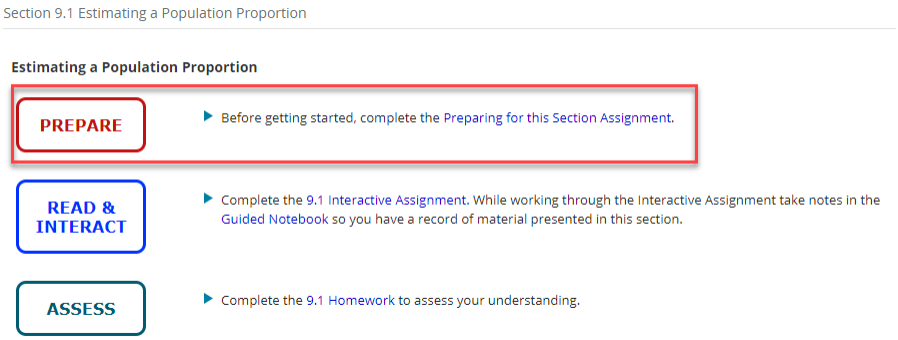
As with the printed texts in the Sullivan Statistics series, a special effort is made to abide by the Guidelines for Assessment and Instruction in Statistics Education (GAISE) for the college introductory

course endorsed by the American Statistical Association (ASA). The GAISE report gives six recommendations for the course:

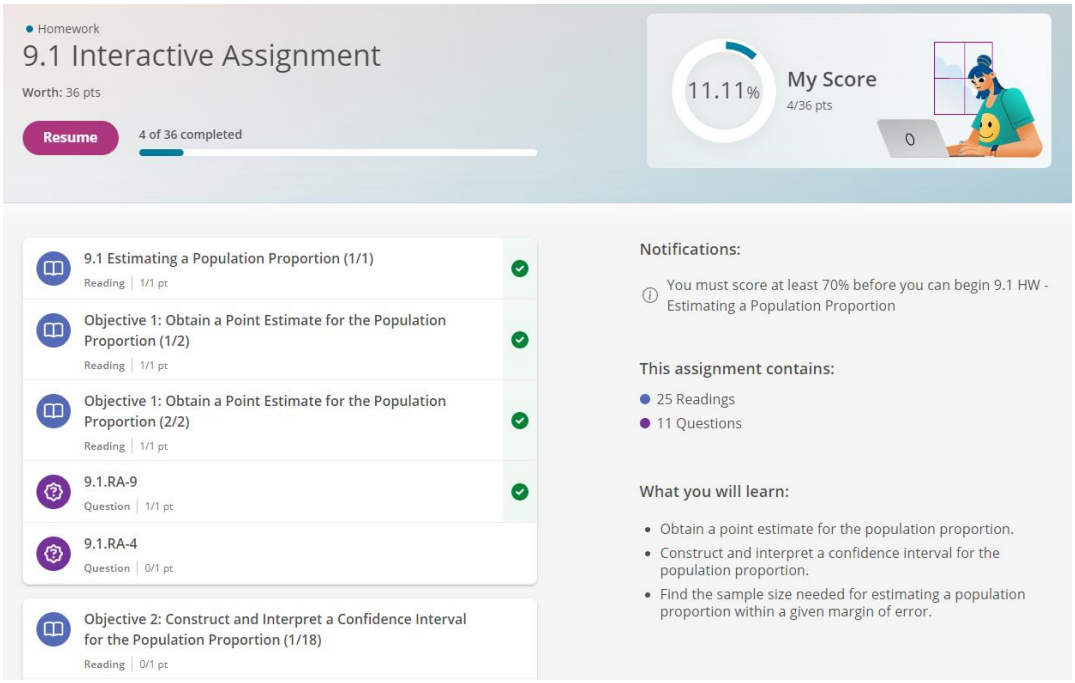
1. Emphasize statistical literacy and develop statistical thinking
2. Use real data in teaching statistics
3. Stress conceptual understanding
4. Foster active learning
5. Use technology for developing conceptual understanding
6. Use assessments to improve and evaluate student learning.

Navigation Within a Typical Section

Most of the sections are preceded with a MyLab assignment that contains exercises based on prerequisite topics called Preparing for… . The assignment is meant to verify that students understand material covered earlier in the course that is needed to succeed in the upcoming section. The problems selected may be changed or deleted by the instructor. Additional problems may be added to the MyLab assignment as well. Finally, this assignment may be set up as a prerequisite for the upcoming section with a level of mastery established by the instructor.

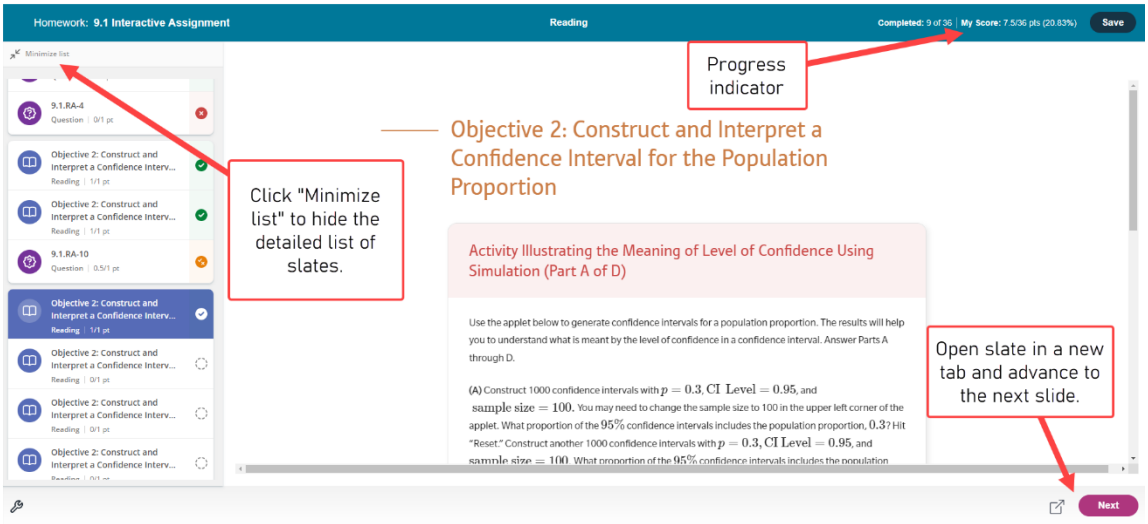


After completing the Preparing for… MyLab assignment, the student moves to the section (**READ & INTERACT**). This is where the student engages with the material and should use the Guided Notebook to take notes. Upon clicking "x.x Interactive Assignment", the student is taken to a section launch page. This page will say "Get started" in the top left corner if the assignment has not been started. The page will say "Resume" along with a progress bar if the student has started the assignment. The top right indicates the student's score on the assignment. The bottom left portion indicates the slates and MyLab exercises that are part of the assignment. When the student has started the assignment, this list will indicate whether the student has completed a particular slate/exercise. This way, the student will know where to resume the assignment.



Each section opens with a list of learning objectives for the section. Most sections have animations below the objective list. The animation provides an overview of where the student is within the course. Think of these videos as a "Where we've been, where we're going" synopsis.

Students have a variety of options in navigating the Interactive Assignment. The list of slates on the left can be hidden by clicking "Minimize list" in the upper-left corner. Clicking on any button in the list will navigate the student to that slate. The student can determine their progress in the upper-right corner. Finally, in the bottom-right corner, students can open the slide in a new tab and advance to the next slate by clicking Next.



Assignment Manager

The structure of each section "out of the box" is Prepare ►Interactive Assignment ► End of Section Homework. However, the instructor has the ability to add MyLab exercises to the Interactive Assignment. So, if you prefer, the end of the Interactive Assignment may contain your end of section MyLab exercises (rather than having a separate end of section assignment. This gives you the flexibility in building assignments you asked for!

Step-by-Step Example Structure and Technology

The examples are set up as Problem statements. We then provide an outline of the recommended Approach in solving the Problem. Next, we present the Solution. Virtually all examples have video solutions. The video solutions are done by hand, using a TI-84C calculator, StatCrunch, and Excel. By clicking on one of the icons (as shown below), you will be able to view a video solution. The instructor should inform their students as to which video solution should be viewed. For example, if you are using StatCrunch as your data analysis tool, then tell the students to only watch the StatCrunch video solution.

Often, we also provide text solutions by hand in the text if we believe it is beneficial to have such a solution for conceptual development. In addition, many of the examples that have video-only solutions will include Results of the analysis completed in the video solution. Again, this is to help your students while they review the material. We also provide Technology Step-by-Step instructions that explain how to obtain results found in the examples using the TI-calculator, StatCrunch, and Excel. Each technology has a "Show/Hide" feature so students can view the technology utilized in class. In addition, the videos include the steps used to obtain the output from each technology.

EXAMPLE 4: Computing a Sample Standard Deviation

Problem In a previous lesson, we obtained a simple random sample of exam scores and computed a sample mean of 73.75. Compute the sample standard deviation of the sample test scores for that data.

Video Solutions

- By hand
- TI-83/84
- StatCrunch
- Microsoft Excel

Technology Step-by-Step

Show TI-83/84 Plus

Hide StatCrunch

Finding the Sample Standard Deviation

1. Enter the raw data into the spreadsheet. Name the column variable.
2. Select **Stat**, highlight **Summary Stats**, and select **Columns**.
3. Click on the variable you want to summarize. Note that Unadj. std.

Text Solution

APPROACH

Follow the same approach used to compute the population standard deviation, but this time use the sample data: Jennifer (62), Juan (88), Ryanne (77), and Dave (68)

When computing the sample standard deviation, be sure to use $\bar{x}$ with as many decimal places as possible to avoid round-off error. However, report the standard deviation to one more decimal place than the original data. For this example, report the standard deviation to the tenths place.

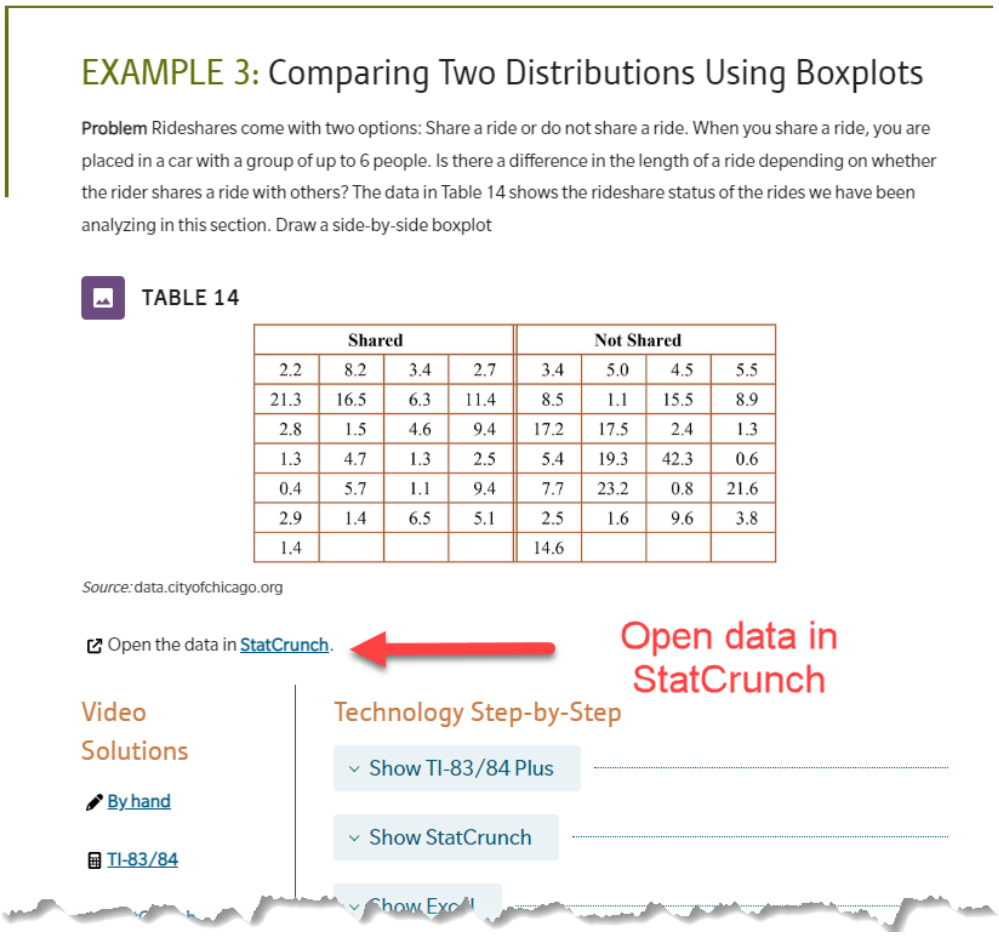
SOLUTION

Step 1. Enter the sample data in Column 1. In Column 2, enter the sample mean. See Table 8(a).

TABLE 8(a)

Score, x_i	Sample Mean, $\bar{x}$
62	73.75
88	73.75
77	73.75
68	73.75

Any problem that has 12 or more observations in the **Data Set** has a link that opens the data in StatCrunch.



EXAMPLE 3: Comparing Two Distributions Using Boxplots

Problem Rideshares come with two options: Share a ride or do not share a ride. When you share a ride, you are placed in a car with a group of up to 6 people. Is there a difference in the length of a ride depending on whether the rider shares a ride with others? The data in Table 14 shows the rideshare status of the rides we have been analyzing in this section. Draw a side-by-side boxplot

TABLE 14

Shared				Not Shared			
2.2	8.2	3.4	2.7	3.4	5.0	4.5	5.5
21.3	16.5	6.3	11.4	8.5	1.1	15.5	8.9
2.8	1.5	4.6	9.4	17.2	17.5	2.4	1.3
1.3	4.7	1.3	2.5	5.4	19.3	42.3	0.6
0.4	5.7	1.1	9.4	7.7	23.2	0.8	21.6
2.9	1.4	6.5	5.1	2.5	1.6	9.6	3.8
1.4				14.6			

Source: data.cityofchicago.org

Open the data in StatCrunch.

Open data in StatCrunch

Video Solutions

By hand

TI-83/84

Technology Step-by-Step

Show TI-83/84 Plus

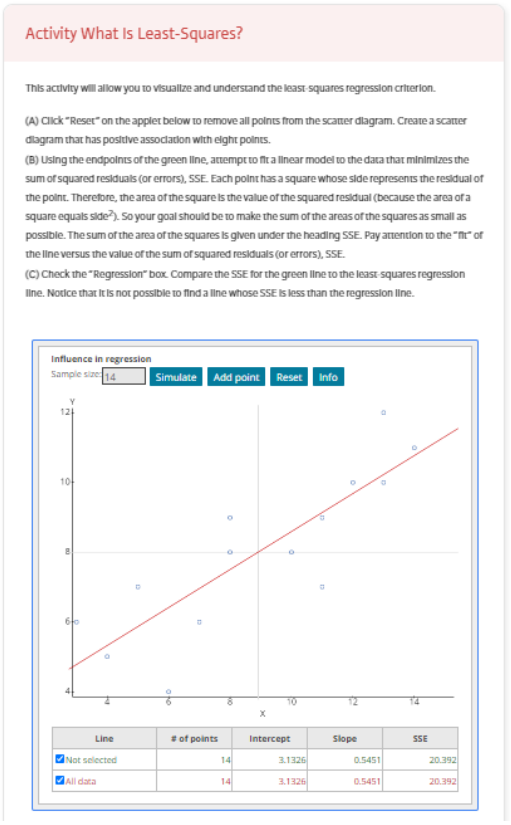
Show StatCrunch

Show Excel

Features within the Interactive Assignment

- **Preparing for This Section** Almost every section has a prebuilt "Preparing for…" MyLab assignment based upon prerequisite skills that are necessary for students to succeed in the section.
- **Objectives** A list of learning objectives for the section is provided. The objectives are linked to the material in the section and are also tabbed on each slide for easy navigation.
- Great efforts were made to extensively incorporate **real data** in the exercises and examples to pique your students' interest and show the relevance of statistics.
- **Step-by-Step Examples** guide students from problem to solution in easy-to-follow steps. Solutions are also provided via video (by hand, TI-84C, StatCrunch, and Excel). Follow-up exercises assess understanding of the material presented. Many of the examples also provide a traditional text solution. Technology steps are provided within examples that include video solutions using TI-84 calculators, StatCrunch, or Excel.

- **Applet Activities** appear throughout the text and help students learn concepts through an experiential approach. Follow-up MyLab exercises assess the student's understanding of the concepts.



- **In Other Words/Caution Animations** Throughout the course, students encounter In Other Words animated videos with avatars. The In Other Words videos are meant to take statistical definitions and concepts and state them in simple, everyday language. The Caution animated videos are meant to alert students to the pitfalls in conducting statistical analysis.

- A **Chapter Summary** delivered via video using a **MindMap**. The MindMap visual summary is available as a pdf that may be downloaded from the Tools for Success. The chapter summary also includes the following:

  - A list of key chapter **Vocabulary** with pop-up definitions.
  - A list of **Formulas** used in the chapter.
  - **Chapter Objectives** listed with corresponding examples for each objective.
  - **Review Exercises** have been coded as MyLab exercises so that students can complete them in MyLab Statistics.
  - **Chapter Test** with answers available. Plus, each chapter test problem has complete worked out video solutions (by hand, TI-84C, StatCrunch, and Excel).
  - **Informed Decisions** and **Case Study** projects allow students to utilize the skills learned within the chapter.

Print Supplements

Interactive Statistics 3e comes with a variety of print supplements.

- **Guided Notebook** Written by author George Woodbury. The Guided Notebook follows the material in the Interactive Assignment. The student is expected to fill out the notebook as they progress through the reading assignment. When complete, the student has a complete text written in their own words. Instructors

may want to check each student's Guided Notebook to verify the student is completing each Interactive Assignment. The Guided Notebook is either available as a print supplement or may be downloaded directly from the left navigation bar in MyLab. In addition, there is a Guided Notebook Instructor's Edition which represents a completely filled in Guided Notebook. This is available in Instructor Resources.

- **Additional Exercises** These are stagnant paper/pencil problems that you may use as additional assignments that are available for each section. The authors use these for weekly homework that is turned in as a formative assessment. This allows instructors to see the student's work and provide feedback. The additional exercises appear in the left navigation bar within the drop-down menu of each section's interactive assignment. They are hidden from student view by default. Answers are provided as well (hidden from student view).
- **Student Activity Workbook** The subject of statistics, like many things in life, is best learned through active participation. These activities have been designed to improve your student's study of statistics, encouraging them to become a more active participant in the discipline. The activity workbook is available as a print supplement or may be downloaded from Tools for Success. **New and updated student activities:**
    - Chapter 1
        - Data Wrangling
        - Retrieving and Cleansing Data
        - Building a Survey Using StatCrunch
    - Chapter 2
        - Graphically Summarizing Qualitative Data_Tornadoes
        - Graphically Summarizing Quantitative Data_Tornadoes
    - Chapter 3
        - Population Mean versus Sample Mean
        - Standard Deviation as a Measure of Spread
        - Numerically Summarizing Data_Tornadoes
    - Chapter 4
        - What Does It Mean to "Regress to the Mean?"
    - Chapter 5
        - Let's Make a Deal
        - Tennis Anyone?
    - Chapter 7
        - Fooled by Randomness
        - Home Run Distances
    - Chapter 8
        - Using Real Data to Describe the Distribution of the Sample Mean: Approximately Normal Population

        - Using Real Data to Describe the Distribution of the Sample Mean: Non-Normal Data
        - Describing the Distribution of the Sample Proportion Using the Urn Applet
    - Chapter 9
        - Tips for a Taxi Ride
    - Chapter 10
        - Sensitivity and Specificity
        - Computing the Power of the Test
        - What is a *P*-Value?
    - Chapter 11
        - Comparing Rental Car Prices
    - Chapter 12
        - COVID-19, Taxis, and Benford's Law
    - Chapter 13
        - Lengths of Tornadoes

- **Instructor Resource Guide** This guide provides an overview of every chapter, suggestions for presenting the material, and additional examples that you may use when developing your lectures. The Instructor Resource Guide is available under Instructor Resources.
- **Classroom Notes** Written by author Michael Sullivan and Heidi Lyne, the classroom notes may be used as a guideline in developing your lectures. Sullivan and Lyne make these notes available to their students and each student fills in the notes during class. The notes have examples different from those in the Interactive Assignment. Available under Instructor Resources.
- **Pre-built Learning Catalytics modules.** Learning Catalytics is a "bring your own device" web-based clicker system. The authors have written modules for each chapter of *Interactive Statistics* that you may use in your classroom. If you are interested in the Learning Catalytics modules, reach out to your Pearson representative.

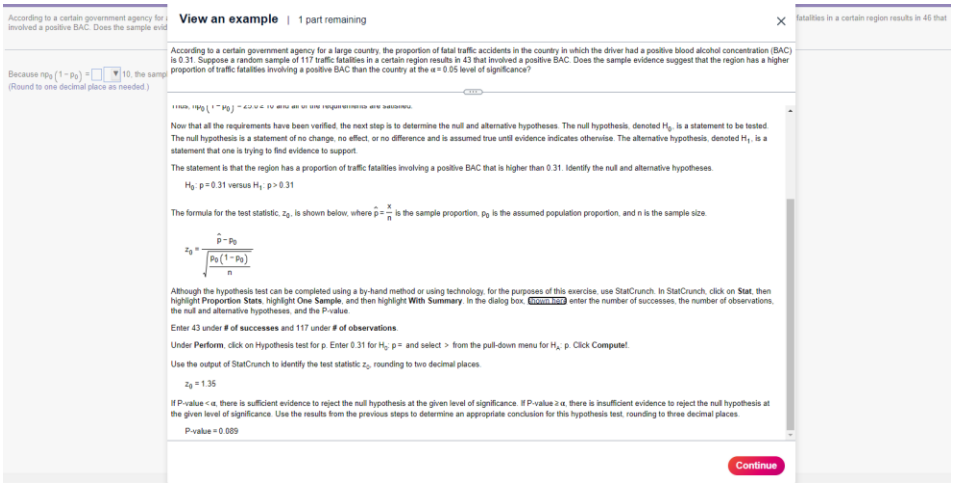
New to this Edition

Based on feedback from users of the second edition, we incorporated many new features into this revision.

- **Updated Platform** Interactive Statistics 3/e is now written in a new platform which allows instructors to customize their course down to the page level in the Assignment Manager. This means an instructor can easily remove objectives they

don't cover in the course. In addition, the instructor can add additional MyLab exercises.

- **Technology specific learning aides** in MyLab exercises for StatCrunch (-SC), TI-84 (-TI), and Excel (-E). Exercises in MyLab with the -SC, -TI, or -E designation will have learning aids (Help Me Solve This and View an Example) that contain technology specific help for your students. For example, in Section 3.2, Problem 29-SC offers specific StatCrunch tech help; Problem 29-E offers specific Excel tech help; Problem 29-TI offers specific TI-84 tech help.



- **Technology Step-by-Step guides** for StatCrunch, TI-84, and Excel. Provides instructions on how to obtain statistical results for each technology section-by-section. Available in MyLab under Tools for Success.
- **Real data-based algorithmic exercises.** These are MyLab exercises written by Michael Sullivan that are based on real data sets that utilize the power of MyLab's algorithms to generate unique problems for your students.

Chapter	Section	Problem
1	6	8
2	1	21
2	2	24, 25, 35
2	3	27
2	4	11, 15
3	1	22, 27, 35, 47
3	2	14, 25, 29
3	4	23

4	1	31, 33, 41, 45, 49
4	2	21, 25, 28
4	3	23
5	4	19
5	6	7
6	1	25, 27
6	2	35, 36, 39
7	2	49, 53, 57
7	3	13
8	1	22, 33, 34
8	2	16, 17, 19
9	1	34, 55
9	2	25, 35, 36, 48
9	3	19, 23, 24
10	2	33, 46
10	3	23, 24, 25
10	3A	1, 2, 3, 9, 11
10	4	21, 23
11	2	17
11	3	18
13	1	23
14	2	17, 18
14	3	19

- **Threaded tornado exercises.** These problems utilize a data set that measures a variety of variables among all tornadoes that struck the United States between 1950 and 2020. Throughout the text, students use the data set to answer questions relevant to the material presented within the section. The following Tornado exercises are programmed in MyLab.

Chapter	Section	Problem
1	1	47
1	3	X1-SC
2	1	25-T
2	2	33-T

3	1	41
3	2	51
3	4	29
4	3	31
5	1	49
8	1	33
9	1	33
9	2	37
10	2	33
10	3	35
11	1	29
11	3	17
12	1	X1, X2
14	2	17

- **Essay questions (-Essay).** These are free response questions, many of which that are algorithmic, that may be assigned in a MyLab quiz or exam. Must be graded by the instructor.
- **Updated lecture videos.** Many of the lecture videos that are part of the Interactive Assignment have been updated to provide a detailed presentation of the material, improve audio quality, and address compliance concerns.
- **New sections.**
    - 14.3 Multiple Regression
    - C.1 Estimating a Population Standard Deviation
    - C.2 Hypothesis Tests for a Population Standard Deviation
    - Integrated Review. A new chapter on functions, exponential functions, and logarithmic functions.
- **Soft skills/Affective domain.** Written by George Woodbury. These provide opportunity for your students to learn about growth mindset and develop study skills as they progress through the course.

INTEGRATED REVIEW

Based on Michael Sullivan's Developmental Math series, Interactive Statistics 3/e comes with a complete integrated review course. We offer a variety of tools to help students master the material. The two most likely to be used by the students are the objective-level videos and the text.

Videos: The videos feature author Michael Sullivan and are created at the objective level so that your students will not waste time watching videos on material they have already mastered. Each video includes a complete development of the topic, along with one or more examples illustrating the mathematics. When the amount of material within a particular objective warrants it, more than one video per objective may be available; this is done to keep video length short so that no one video is overwhelming.

Text: The text presents explanations, definition, examples, and homework problems for you to assign to your students. There is a Quick Response (QR) code at the beginning of each section in the text that allows you access to all the videos in the section.

Worksheets: A worksheet for each objective has a variety of exercises for the student to work on. Also provides a reference to the text so that students can easily remediate.

TABLE OF CONTENTS

1.6 The Design of Experiments
Objective 1: Describe the Characteristics of an Experiment
Objective 2: Explain the Steps in Designing an Experiment
Objective 3: Explain the Completely Randomized Design
Objective 4: Explain the Matched-Pairs Desig

Chapter 1 Review
Chapter 1 Test
Chapter 1 Projects
Making an Informed Decision: What College Should I Attend?
Case Study: Chrysalises for Cash

Chapter 2: Organizing and Summarizing Data

2.1 Organizing Qualitative Data
Objective 1: Organize Qualitative Data in Tables
Objective 2: Construct Bar Graphs
Objective 3: Construct Pie Charts

2.2 Organizing Quantitative Data: The Popular Displays
Objective 1: Organize Discrete Data in Tables
Objective 2: Construct Histograms of Discrete Data
Objective 3: Organize Continuous Data in Tables
Objective 4: Construct Histograms of Continuous Data
Objective 5: Draw Dot Plots
Objective 6: Identify the Shape of a Distribution

2.3 Additional Displays of Quantitative Data
Objective 1: Draw Stem-and-Leaf Plots
Objective 2: Construct Frequency Polygons
Objective 3: Create Cumulative Frequency and Relative Frequency Distributions
Objective 4: Construct Frequency and Relative Frequency Ogives
Objective 5: Draw Time-Series Graphs

2.4 Graphical Misrepresentations of Data
Objective 1: Describe What Can Make a Graph Misleading or Deceptive

Chapter 2 Review
Chapter 2 Test
Chapter 2 Projects
Making an Informed Decision: Tables or Graphs?
Case Study: The Day the Sky Roared

Chapter 3: Numerically Summarizing Data

3.1 Measures of Central Tendency
Objective 1: Determine the Arithmetic Mean of a Variable from Raw Data
Objective 2: Determine the Median of a Variable from Raw Data
Objective 3: Explain What It Means for a Statistic to be Resistant
Objective 4: Determine the Mode of a Variable from Raw Data

3.2 Measures of Dispersion
Objective 1: Determine the Range of a Variable from Raw Data
Objective 2: Determine the Standard Deviation of a Variable from Raw Data
Objective 3: Determine the Variance of a Variable from Raw Data
Objective 4: Use the Empirical Rule to Describe Data That Are Bell-Shaped

3.3 Measures of Central Tendency and Dispersion from Grouped Data
Objective 1: Approximate the Mean of a Variable from Grouped Data
Objective 2: Compute the Weighted Mean
Objective 3: Approximate the Standard Deviation from Grouped Data

3.4 Measures of Position
Objective 1: Determine and Interpret z-scores
Objective 2: Interpret Percentiles
Objective 3: Determine and Interpret Quartiles
Objective 4: Determine and Interpret the Interquartile Range
Objective 5: Check a Set of Data for Outliers

3.5 The Five-Number Summary and Boxplots
Objective 1: Determine the Five-Number Summary
Objective 2: Draw and Interpret Boxplots
Chapter 3 Review
Chapter 3 Test
Chapter 3 Projects
Making an Informed Decision: What Car Should I Buy?
Case Study: Who Was "A Mourner?"

Chapter 4: Describing the Relation between Two Variables
4.1 Scatter Diagrams and Correlation
Objective 1: Draw and Interpret Scatter Diagrams
Objective 2: Describe the Properties of the Linear Correlation Coefficient
Objective 3: Compute and Interpret the Linear Correlation Coefficient
Objective 4: Determine Whether a Linear Relation Exists between Two Variables
Objective 5: Explain the Difference between Correlation and Causation

4.2 Least-Squares Regression
Objective 1: Find the Least-Squares Regression Line and Use the Line to Make Predictions
Objective 2: Interpret the Slope and the y-Intercept of the Least-Squares

Regression Line
Objective 3: Compute the Sum of Squared Residuals

4.3 Diagnostics on the Least-Squares Regression Line
Objective 1: Compute and Interpret the Coefficient of Determination
Objective 2: Perform Residual Analysis on a Regression Model
Objective 3: Identify Influential Observations

4.4 Contingency Tables and Association
Objective 1: Compute the Marginal Distribution of a Variable
Objective 2: Use the Conditional Distribution to Identify Association Among Categorical Data
Objective 3: Explain Simpson's Paradox

Chapter 4 Review
Chapter 4 Test
Practice Test Problems
Chapter 4 Projects
Making an Informed Decision: Relations among Variables on a World Scale
"Case Study: Thomas Malthus, Population, and Subsistence"

Chapter 5: Probability

5.1 Probability Rules
Objective 1: Understand Random Processes and the Law of Large Numbers
Objective 2: Apply the Rules of Probabilities
Objective 3: Compute and Interpret Probabilities Using the Empirical Method
Objective 4: Compute and Interpret Probabilities Using the Classical Method
Objective 5: Recognize and Interpret Subjective Probabilities

5.2 The Addition Rule and Complements
Objective 1: Use the Addition Rule for Disjoint Events
Objective 2: Use the General Addition Rule
Objective 3: Compute the Probability of an Event Using the Complement Rule

5.3 Independence and the Multiplication Rule
Objective 1: Identify Independent Events
Objective 2: Use the Multiplication Rule for Independent Events
Objective 3: Compute At-Least Probabilities
Summary

5.4 Conditional Probability and the General Multiplication Rule
Objective 1: Compute Conditional Probabilities
Objective 2: Compute Probabilities Using the General Multiplication Rule

5.5 Counting Techniques
Objective 1: Solve Counting Problems Using the Multiplication Rule
Objective 2: Solve Counting Problems Using Permutations
Objective 3: Solve Counting Problems Using Combinations
Objective 4: Solve Counting Problems Involving Permutations with Nondistinct Items
Summary
Objective 5: Compute Probabilities Involving Permutations and Combinations

5.6 Simulation
Objective 1: Use Simulation to Obtain Probabilities

5.7 Putting It Together: Which Method Do I Use?
Objective 1: Determine the Appropriate Probability Rule to Use
Objective 2: Determine the Appropriate Counting Technique to Use

Chapter 5 Review
Chapter 5 Test
Chapter 5 Projects
Making an Informed Decision: What Are the Effects of Drinking and Driving?
Case Study: The Case of the Body in the Bag

Chapter 6: Discrete Probability Distributions

6.1 Discrete Random Variables
Objective 1: Distinguish between Discrete and Continuous Random Variables
Objective 2: Identify Discrete Probability Distributions
Objective 3: Graph Discrete Probability Distributions
Objective 4: Compute and Interpret the Mean of a Discrete Random Variable
Objective 5: Interpret the Mean of a Discrete Random Variable as an Expected Value
Objective 6: Compute the Standard Deviation of a Discrete Random Variable

6.2 The Binomial Probability Distribution
Objective 1: Determine Whether a Probability Experiment Is a Binomial Experiment
Objective 2: Compute Probabilities of Binomial Experiments
Objective 3: Compute the Mean and Standard Deviation of a Binomial Random Variable
Objective 4: Graph a Binomial Probability Distribution

6.3 The Poisson Probability Distribution
Objective 1: Determine Whether a Probability Experiment Follows a Poisson Process

Objective 2: Compute Probabilities of a Poisson Random Variable
Objective 3: Find the Mean and Standard Deviation of a Poisson Random Variable

Chapter 6 Review
Chapter 6 Test
Chapter 6 Projects
Making an Informed Decision: Should We Convict?
Case Study: The Voyage of the St. Andrew

Chapter 7: The Normal Probability Distribution

7.1 Properties of the Normal Distribution
Objective 1: Use the Uniform Probability Distribution
Objective 2: Graph a Normal Curve
Objective 3: State the Properties of the Normal Curve
Objective 4: Explain the Role of Area in the Normal Density Function

7.2 Applications of the Normal Distribution
Objective 1: Find and Interpret the Area under a Normal Curve
Objective 2: Find the Value of a Normal Random Variable

7.3 Assessing Normality
Objective 1: Use Normal Probability Plots to Assess Normality

7.4 The Normal Approximation to the Binomial Probability Distribution
Objective 1: Approximate Binomial Probabilities Using the Normal Distribution

Chapter 7 Review
Chapter 7 Test
Chapter 7 Projects
Making an Informed Decision: Which Stock Do I Pick?
Case Study: A Tale of Blood Chemistry

Chapter 8: Sampling Distributions

8.1 Distribution of the Sample Mean
Objective 1: Describe the Distribution of the Sample Mean: Normal Population
Objective 2: Describe the Distribution of the Sample Mean: Non-normal Population

8.2 Distribution of the Sample Proportion
Objective 1: Describe the Sampling Distribution of a Sample Proportion
Objective 2: Compute Probabilities of a Sample Proportion

Chapter 8 Review
Chapter 8 Test
Chapter 8 Projects
Making an Informed Decision: How Would You Break Down Your Day?
Case Study: Sampling Distribution of the Median

Chapter 9: Estimating the Value of a Parameter

9.1 Estimating a Population Proportion
Objective 1: Obtain a Point Estimate for the Population Proportion
Objective 2: Construct and Interpret a Confidence Interval for the Population Proportion
Objective 3: Determine the Sample Size Necessary for Estimating a Population Proportion within a Specified Margin of Error

9.2 Estimating a Population Mean
Objective 1: Obtain a Point Estimate for the Population Mean
Objective 2: State Properties of Student's t-Distribution
Objective 3: Determine t-Values
Objective 4: Construct and Interpret a Confidence Interval for a Population Mean
Objective 5: Determine the Sample Size Necessary for Estimating a Population Mean within a Given Margin of Error

9.3 Putting It Together: Which Procedure Do I Use?
Objective 1 Determine the Appropriate Confidence Interval to Construct

9.4 Estimating with Bootstrapping
Objective 1: Estimate a Parameter Using the Bootstrap Method

Chapter 9 Review
Chapter 9 Test
Chapter 9 Projects
Making an Informed Decision: How Much Should I Spend for this House?
Case Study: Fire-Safe Cigarettes

Chapter 10: Hypothesis Tests Regarding a Parameter

10.1 The Language of Hypothesis Testing
Objective 1: Determine the Null and Alternative Hypotheses
Objective 2: Explain Type I and Type II Errors
Objective 3: State Conclusions to Hypothesis Tests

10.2 Hypothesis Tests for a Population Proportion
Objective 1: Explain the Logic Of Hypothesis Testing

Objective 2: Test Hypotheses about a Population Proportion
Objective 3: Test Hypotheses about a Population Proportion Using the Binomial Probability Distribution

10.2A Hypothesis Tests on a Population Proportion with Simulation
Objective 1: Explain the Logic of the Simulation Method
Objective 2: Test Hypotheses about a Population Proportion Using the Simulation Method

10.2B Hypothesis Tests on a Population Proportion Using the Normal Model
Objective 1: Explain the Logic of Hypothesis Testing Using the Normal Model
Objective 2: Test Hypotheses about a Population Using the Normal Model
Objective 3: Test Hypotheses about a Population Using the Binomial Probability Distribution

10.3 Hypothesis Tests for a Population Mean
Objective 1: Test Hypotheses about a Population Mean
Objective 2: Explain the Difference between Statistical Significance and Practical Significance

10.3A Hypothesis Tests on a Population Mean Using Simulation and the Bootstrap
Objective 1: Test Hypotheses about a Population Mean Using the Simulation Method
Objective 2: Test Hypotheses about a Population Mean Using the Bootstrap

10.4 Putting It Together: Which Procedure Do I Use?
Objective 1: Determine the Appropriate Hypothesis Test to Perform

Chapter 10 Review
Chapter 10 Test
Chapter 10 Projects
Making an Informed Decision: Which Mutual Fund Should I Choose?
Case Study: How Old Is Stonehenge?
Chapter 11: Inference on Two Samples

Chapter 11: Inference about Two Population Parameters

11.1 Inference about Two Population Proportions: Independent Samples
Objective 1: Distinguish between Independent and Dependent Sampling
Objective 2: Test Hypotheses Regarding Two Population Proportions from Independent Samples
Objective 3: Construct and Interpret Confidence Intervals for the Difference between Two Population Proportions
Objective 4: Determine the Sample Size Necessary for Estimating the Difference between Two Population Proportions

11.1A Using Randomization Techniques to Compare Two Proportions
Objective 1: Use Randomization to Compare Two Population Proportions

11.2 Inference about Two Population Means: Dependent Samples
Objective 1: Test Hypotheses for a Population Mean from Matched-Pairs Data
Objective 2: Construct and Interpret Confidence Intervals about a Population Mean Difference of Matched-Pairs Data

11.2A Using Bootstrapping to Conduct Inference on Two Dependent Means
Objective 1: Test Hypotheses about Two Dependent Means Using the Bootstrap Method

11.3 Inference about Two Population Means: Independent Samples
Objective 1: Test Hypotheses Regarding Two Population Means from Independent Samples
Objective 2: Construct and Interpret Confidence Intervals about the Difference of Two Independent Means

11.3A Using Randomization Techniques to Compare Two Independent Means
Objective 1: Use Randomization to Compare Two Population Means

11.4 Putting It Together: Which Procedure Do I Use?
Objective 1: Determine the Appropriate Hypothesis Test to Perform

Chapter 11 Review
Chapter 11 Test
Chapter 11 Projects
Making an Informed Decision: Which Car Should I Buy?
Case Study: Control in the Design of an Experiment

Chapter 12: Inference on Categorical Data

12.1 Goodness-of-Fit Test
The Chi-Square Distribution
Objective 1: Perform a Goodness-of-Fit Test

12.2 Tests for Independence and the Homogeneity of Proportions
Objective 1: Perform a Test for Independence
Objective 2: Perform a Test for Homogeneity of Proportions

12.3 Inference about Two Population Proportions: Dependent Samples
Objective 1: Test Hypotheses Regarding Two Proportions from Dependent Samples

Chapter 12 Review
Chapter 12 Test
Chapter 12 Projects
Making an Informed Decision: What Are the Benefits of College?
"Case Study: Feeling Lucky? Well, Are You? "

Chapter 13: Comparing Three or More Means

13.1 Comparing Three or More Means: One-Way Analysis of Variance
Introduction to One-Way Analysis of Variance
Objective 1: Verify the Requirements to Perform a One-Way ANOVA
Objective 2: Test a Hypothesis Regarding Three or More Means Using One-Way ANOVA

13.2 Post Hoc Tests on One-Way Analysis of Variance
Objective 1: Perform Tukey's Test

Chapter 13 Review
Chapter 13 Test
Chapter 13 Projects
Making an Informed Decision: Where Should I Invest?
Case Study: Hat Size and Intelligence

Chapter 14: Inference on the Least-Squares Regression Model and Multiple Regression

14.1 Testing the Significance of the Least-Squares Regression Model
Review of Least-Squares Regression
Objective 1: State the Requirements of the Least-Squares Regression Model
Objective 2: Compute the Standard Error of the Estimate
Objective 3: Verify That the Residuals Are Normally Distributed
Objective 4: Conduct Inference on the Slope of the Least-Squares Regression Model
Objective 5: Construct a Confidence Interval about the Slope of the Least-Squares Regression Model

14.1A Using Randomization Techniques on the Slope of the Least-Squares Regression Line
Objective 1: Use Randomization to Test the Significance of the Slope of the Least-Squares Regression Model

14.2 Confidence and Prediction Intervals
Confidence and Prediction Intervals
Objective 1 Construct Confidence Intervals for a Mean Response

Objective 2 Construct Prediction Intervals for an Individual Response

14.3 Introduction to Multiple Regression **(NEW!)**
Introduction
Objective 1 Obtain the Correlation Matrix
Objective 2 Use Technology to Find a Multiple Regression Equation
Objective 3 Interpret the Coefficients of a Multiple Regression Equation
Objective 4 Determine R2 and Adjusted R2
Objective 5 Perform an F-Test for Lack of Fit
Objective 6 Test Individual Regression Coefficients for Significance
Objective 7 Construct Confidence and Prediction Intervals
Multicollinearity Revisited

Chapter 14 Review
Chapter 14 Test
Chapter 14 Projects
Making an Informed Decision: What Should I Pay for this Home?
Case Study: Housing Boom

Appendix A Tables and Formulas

Appendix B Lines
Objective 1: Calculate and Interpret the Slope of a Line
"Objective 2: Graph Lines, Given a Point and the Slope"
Objective 3: Use the Point-Slope Form of a Line; Identify Horizontal Lines
"Objective 4: Find the Equation of a Line, Given Two Points"
Objective 5: Identify the Slope and y-Interecept of a Line from Its Equation

Appendix C Inference on a Population Standard Deviation (NEW!)
C.1 Estimating a Population Standard Deviation
Objective 1: Find Critical Values for the Chi-Square Distribution
Objective 2: Construct and Interpret Confidence Intervals for the Population Variance and Standard Deviation

C.2 Hypothesis Tests for a Population Standard Deviation
Objective 1: Test Hypotheses about a Population Standard Deviation