



# Quantitative Reasoning with Corequisite Support: A Targeted Review

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Alta Quantitative Reasoning is a 1 - 2 semester course intended for students who require quantitative literacy skills. Many students pursuing a degree that has a general education math requirement will take this course. To develop this course, Knewton used four main sources of content: OpenStax Introductory Statistics, OpenStax PreAlgebra, Washington Open Course Library, and videos from an Online Stat book developed by Rice University, University of Houston, and Tufts University, along with a team of Subject Matter Experts. The SMEs come from diverse backgrounds and are all accomplished academics in the field of Mathematics, and have experience teaching and designing Quantitative Reasoning courses. Knewton Quantitative Reasoning covers the breadth of quantitative reasoning topics and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

Alta Quantitative Reasoning has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our text, video, and original SME content, we were able to solicit ideas from Quantitative Reasoning instructors and students at all levels of higher education, from community colleges to Ph.D- granting universities. Alta Quantitative Reasoning provides a level of academic rigor, while also promoting relevance and accessibility for students. Knewton has added current and relevant contexts and examples to instruction and assessments.

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### Chapter 1: Critical Thinking and Set Theory

#### 1.1 Inductive / Deductive

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- Understand and use deductive reasoning
- Identify the premise and conclusion of an argument
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#### 1.2 Estimation

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#### 1.3 Introduction to Problem Solving

- Explain Polya's four steps to solving a problem
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-

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- Use the power rule of exponents

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- Use conditional probability notation to describe events

#### 5.2 Basic Probability

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- Compute basic probability in a situation where there are equally-likely outcomes
- Compute probability involving and, or, and not
- Compute probability using the complement rule

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### **Chapter 7: Data Collection and Sampling**

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- Determine whether a study is observational or an experiment and appropriate use cases
- Identify components of the experimental design in a given experiment: use of a control group, use of a placebo, and blinding
- Identify confounding variables

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- Identify explanatory and response variables in an experiment
- Define and distinguish between qualitative, quantitative, discrete, and continuous variables
- Identify levels of measurement of data

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- Construct and understand frequency tables for a set of data with technology - Excel
- Construct and understand relative frequency tables for a set of data with technology - Excel
- Create and interpret histograms with technology - Excel

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- Create and interpret dot plots with technology - Excel
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### 8.10 Choose appropriate graphs to display data

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- Use the normal distribution to compute probability with technology - Excel
- Use the normal distribution to compute a value for a random variable given probability - Excel
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- Use a formula
  - Solve a formula for a given variable
  - Solve a formula for a specific variable
-

- Use a formula to solve a geometric application

### 11.3 Slope and Intercepts

- Plot ordered pairs in a Cartesian coordinate system
- Graph equations by plotting points
- Graph linear equations by plotting points
- Interpret slope as a rate of change
- Find the slope given a line or given two points

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- Graph linear equations using point-slope form
- Graph a line using a point and the slope
- Understand the relationship between the slope and y-intercept of a line and its equation

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- Determine a linear function using point-slope form
- Find equation of a line, in slope-intercept form, given slope and one point (point-slope formula)
- Find equation, in slope-intercept form, of a line passing through two given points

### 11.6 Working with Linear Equations

- Write the equation of a line using a point and a slope
- Write the equation of a line using two points
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- Calculate a slope in word problems

### 11.7 Graphing Special Cases

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- Use interval notation
- Use properties of inequalities
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-

- Convert from exponential to logarithmic form

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- Use Jefferson's method of determining apportionment
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- Identify where the Alabama paradox occurs
- Identify where the population paradox occurs
- Identify where the new states paradox occurs
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- Understand and identify prime and composite numbers
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- Order and compare integers
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