

# MATH 105 Quantitative Reasoning

## Readings and Practice Exercises

The readings and the practice exercises are for *Thinking Mathematically, 7<sup>th</sup> Edition*, by Robert Blitzer, © 2019, Pearson Education, Inc.

(Books a la Carte Edition packaged with MyMathLab ISBN 9780136209171 | MyMathLab ISBN 9780135903575)



Studying includes *but is not limited to* reading the course textbook, *reworking* the examples in the textbook and those examined during class, working on practice exercises listed in this document and those provided on course handouts, asking questions during class and outside of class, working with other students and with the instructor, and reviewing and augmenting course notes *daily*.

You can only learn the material – *make it your own* – by *working on it*: you do not learn by watching but by trying, thinking, puzzling, *rethinking*, discussing, *reworking*, and practicing. *Real* mathematics problems, just like all good things, are more involved and take more time to *accomplish*. So, as you learn *more interesting mathematics*, the problems and questions you examine require more time and additional practice before you come to appreciate their beauty and power. However, if you put-in the time and effort then you will be in awe of the mathematics that you learn *and* you may even *enjoy* it.

Keep in mind that there is **no such thing as a stupid question**. Your questions are always welcome: *asking questions*, like working on practice exercises, *enables you to learn*.



## Why should I care about quantitative reasoning skills?

Watch the [TedTalks](#) for which hyperlinks are provided below. These [TedTalks](#) showcase the need for the ability to understand, analyze, interpret, and draw conclusions about real-world quantitative information in context, that is, *the need for quantitative reasoning skills*. Consider how acquiring such skills may be helpful to you in your program of study and in your future career.

- [Rob Reid: The \\$8 billion iPod](#)
- [David McCandless: The Beauty of Data Visualization](#)
- [Chris Jordan: Turning Powerful Stats into Art](#)
- [Hans Rosling: The Magic Washing Machine](#)
- [Peter Donnelly: How Juries are fooled by Statistics](#)
- [Aaron Koblin: Visualizing Ourselves ... with Crowd-sourced Data](#)

What can and *should* we (have) learn(ed) for the future from analysis of the past?

- [Laurie Garrett: Lessons from the 1918 flu](#) (presented during TED 2007)



## Problem Solving

### 1.1 Inductive and Deductive Reasoning

Read: pages 2 – 10.

Practice: page 11, #1 – 35 (odd), 39, 41, 47 – 59 (odd).  
page 43, #3 – 9 (odd), 13.

The hyperlink below provides some “food for thought” about mathematics, patterns, representations, and *change of perspective*.

- [Roger Antonsen: Math is the hidden secret to understanding the world](#)

### 1.3 Problem Solving

Read: pages 30 – 37.

Practice: page 38, #1 – 27, 31 – 35 (odd), 39, 41, 45 – 49 (odd), 51 – 54.

page 46, #31 – 37 (odd).

page 46, #3 – 7 (odd).

The hyperlink below provides some “food for thought” about the (mis)use of graphs.

- [Lea Gaslowitz: How to spot a misleading graph](#)

### Analysis and Interpretation of Graphs

Read: pages 18 – 25.

Read: pages 780 – 781.

Practice: page 27, #43 – 52, 62, 63, 71 – 74.

page 44, #24, 27 – 30.

page 47, #13, 16.

page 784, #33 – 37.

page 840, #7.

The hyperlink below provides some “food for thought” about number sequences.

- [Alex Gendler: Can you find the next number in this sequence?](#)

### 5.7 Arithmetic and Geometric Series

Read: pages 326 – 332.

Practice: page 333, #1 – 123 (odd), 127, 129.

page 340, #127 – 145 (odd), 148.

page 342, #27 – 30.

The hyperlink below provides some “food for thought” about estimation.

- [Michael Mitchell: A clever way to estimate enormous numbers](#)

## Dimensional Analysis and Estimation

### 9.1 Measuring Length; The Metric System

Read: pages 582 – 589.

Practice: page 590, #1 – 55 (odd), 75 – 84.

page 612, #1 – 19 (odd).

page 614, #7, 16, 17.

### 9.2 Measuring Area and Volume

Read: pages 592 – 599.

Practice: page 599, #5 – 11 (odd), 15 – 57 (odd), 67 – 76.

page 612, #22 – 26, 31 – 34.

page 614, #8 – 10, 12 – 15.

### 9.3 Measuring Weight and Temperature

Read: pages 602 – 608.

Practice: page 609, #1 – 49 (odd), 67 – 69.

page 613, #39 – 49.

The hyperlink below provides some “food for thought” about some principles of finance.

- [German Nande: The time value of money](#)

## Personal Finance

### 8.1 Percent, Sales Tax, and Discounts

Read: pages 494 – 500.

Practice: page 501, #1 – 55 (odd).  
page 379, #37 – 40, 41, 42.  
page 408, #25, 26.  
page 410, #15.  
page 575, #1 – 17 (odd).  
page 578, #1.

### 8.2 Income Tax

Read: pages 503 – 511.

Practice: page 512, #1 – 25.  
page 575, #19 – 25 (odd).  
page 578, #3, 5.

### 8.3 Simple Interest

Read: pages 514 – 517.

Practice: page 518, #1 – 25 (odd), 27 – 30, 31 – 37 (odd).  
page 576, #27 – 35 (odd).  
page 579, #7, 9.

### 8.4 Compound Interest

Read: pages 519 – 526.

Practice: page 526, #1 – 57 (odd).  
page 576, #37 – 45 (odd).  
page 579, #11, 13.

### 8.5 Annuities, Methods of Saving, and Investments

Read: pages 529 – 541.

Practice: page 541, #1 – 17 (odd), 21 – 35 (odd).  
page 576, #47.  
page 579, #15

### 8.6 Cars

Read: pages 545 – 551.

Practice: page 552, #1 – 15 (odd).  
page 577, #59.

### 8.7 The Cost of Home Ownership

Read: pages 554 – 561.

Practice: page 561, #1 – 11 (odd), 13 – 16.  
page 577, #65, 67.  
page 579, #20 – 25.

### 8.8 Credit Cards

Read: pages 563 – 569.

Practice: page 570, #1 – 9 (odd).  
page 578, #71.  
page 580, #27.

## Linear Equations and Linear Inequalities

### 6.2 Linear Equations in One Variable and Proportion

Read: pages 354 – 365.

Practice: page 366, #21, 23, 33 – 57.  
page 407, #8 – 18.  
page 409, #3 – 7, 9, 10.

### 6.3 Applications of Linear Equations

Read: pages 369 – 376.

Practice: page 377, #1 – 35 (odd).  
page 407, #19 – 24.  
page 410, #13, 14.  
page 579, #19.

### 6.4 Linear Inequalities in One Variable

Read: pages 380 – 387.

Practice: page 388, #35 – 65 (odd), 71 – 76, 85 – 93 (odd).  
page 408, #31 – 38.  
page 410, #16 – 19.

### 7.2 Linear Functions and Their Graphs

Read: pages 424 – 434.

Practice: page 435, #1 – 61 (odd).  
page 486, #17 – 34.  
page 490, #6 – 11.

### 7.3 Systems of Linear Equations in Two Variables

Read: pages 438 – 448.

Practice: page 449, #13 – 35 (odd), 47 – 50, 51 – 60.  
page 487, #35 – 48.  
page 491, #12 – 15.

### 7.4 Linear Inequalities in Two Variables

Read: pages 453 – 459.

Practice: page 460, #1 – 41 (odd), 45 – 48.  
page 488, #49 – 55, 56 – 61.  
page 491, #16 – 19.

### 7.5 Linear Programming

Read: pages 462 – 466.

Practice: page 466, #1 – 4, 5 – 12, 13 – 18.  
page 488, #62 – 64.  
page 491, #20 – 22.

The hyperlinks below provide some “food for thought” about the use of statistics.

- [Alan Smith: Why you should love statistics](#)
- [Malte Spitz: Your phone company is watching](#)
- [Anne Milgram: Why smart statistics are the key to fighting crime](#)
- [Hans Rosling: The best stats you've ever seen](#) (Statistics and the World Health)
- [Arthur Benjamin: Teach statistics before calculus!](#)

The hyperlink below provides some “food for thought” about the misuse of statistics.

- [Mark Liddell: How statistics can be misleading](#)
- [Lea Gaslowitz: How to spot a misleading graph](#)

## Statistics

### 12.1 Sampling, Frequency Distributions, and Graphs

Read: pages 772 – 781.

Practice: page 782, #3 – 21 (odd), 31, 33 – 37.  
page 840, #2 – 6.

### 12.2 Measures of Central Tendency

Read: pages 786 – 796.

Practice: page 797, #1 – 57 (odd).  
page 840, #9 – 11, 15, 19, 21.

### 12.3 Measures of Dispersion

Read: pages 800 – 805.

Practice: page 806, #1 – 37 (odd).  
page 841, #23 – 29 (odd).

### 12.4 The Normal Distribution

Read: pages 808 – 819.

Practice: page 819, #1 – 73 (odd).  
page 841, #31 – 51.

### 12.5 Problem Solving with the Normal Distribution

Read: pages 822 – 826.

Practice: page 826, #1 – 35 (odd).  
page 842, #52 – 58,

### 12.6 Scatter Plots, Correlation, and Regression Lines

Read: pages 827 – 834.

Practice: page 835, #1 – 7 (odd), 27 – 30, 31 – 45 (odd).  
page 842, #59 – 70.

Putting It All Together: page 843, #2 – 26.

The hyperlinks below provide some “food for thought” for about counting and probability.

- [Yannay Khaikin: How many ways can you arrange a deck of cards?](#)
- [Dan Katz: Can you solve the cheating royal riddle?](#)
- [Leonardo Barichello: The last banana: A thought experiment in probability](#)
- [Wajdi Mohamed Ratemi: The mathematical secrets of Pascal's triangle](#)

## Counting Methods and Probability Theory

### 11.1 The Fundamental Counting Principle

Read: pages 694 – 698.

Practice: page 698, #1 – 21 ( odd).  
page 765, #1 – 6.

### 11.2 Permutations

Read: pages 700 – 706.

Practice: page 706, #1 – 7 (odd), 11, 41 – 55 (odd).  
page 765, #11, 12, 16, 18, 19, 21, 23, 24, 25, 28.

### 11.3 Combinations

Read: pages 708 – 712.

Practice: page 713, #1 – 4, 29 – 59 (odd), 61 – 68.  
page 765, #13, 14, 15, 17, 20, 22, 26, 27.

#### 11.4 Fundamentals of Probability

Read: pages 715 – 721.

Practice: page 721, #1 – 69 (odd).  
page 766, #29 – 40, 42 – 44.

#### 11.5 Probability with the Fundamental Counting Principle, Permutations, and Combinations

Read: pages 724 – 728.

Practice: page 729, #1 – 19 (odd).  
page 766, #50, 52, 10 – 102.

#### 11.6 Events Involving *Not* and *Or*; Odds

Read: pages 731 – 740.

Practice: page 741, #1 – 10, 13 – 48, 67 – 78.  
page 767, #53 – 69, 72 – 78, 103, 104.

#### 11.7 Events Involving *And*; Conditional Probability

Read: pages 744 – 752.

Practice: page 753, #1 – 31 (odd), 33 – 36, 37 – 47 (odd), 49 – 72.  
page 767, #79 – 85, 88 – 99.  
page 768, #105, 106.

#### 11.8 Expected Value

Read: pages 756 – 760.

Practice: page 761, #1 – 8, 11 – 19.  
page 769, #107 – 110.

Putting It All Together: page 769, #1 – 10, 12 – 28.

The hyperlinks below provide some end-of-course “food for thought” about related topics.

- [Judd A. Schorr: Can you solve the airplane riddle?](#)
- [Nina Klietsch: Why do airlines sell too many tickets?](#)
- [John David Walters: Where do math symbols come from?](#)