# MATH 105 Math for Modern Society

**Readings and Practice Exercises**

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

[MyMathLab ISBN 9780135903575 | Books a la Carte Edition packaged with MyMathLab ISBN 9780136209171]

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).

6.3 Applications of Linear Equations (i.e. *Problem Solving Involving Equations*)⌘
Read: pages 369 – 376.
Practice: page 377, #1 – 35 (odd), 37 – 42.
page 407, #19.
page 408, #25, 26.
page 410, #13 – 15.

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 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.
Page 844, #7.

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).

Putting It All Together: page 843, #2 – 6, 8 – 15.

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 Sequences
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 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.

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.

Putting It All Together: page 844, #16 – 19.

## ⌘Additional Practice with Linear Equations

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.

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.

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?