



Mental Math for Pilots

Second Edition



Ronald D. McElroy

Mental Math for Pilots
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Table of Contents

Introduction	vii
A Note from Cheryl Cage of Cage Consulting, Inc.	xi
Chapter 1	
Taking the First Step	1
Chapter 2	
Airborne Math Problems	5
Chapter 3	
Calculating Enroute Descents	39
Chapter 4	
Calculating Visual Descent Points	49
Chapter 5	
Mental Math Test	61
Chapter 6	
Summary	65
Chapter 7	
Answer Key	69
Appendix A	
Basic Math Exercises	77
Appendix B	
Reference Tables and Charts	91
List of Mental Math Formulas	101
Glossary of Acronyms and Terms	105
Index	111
About the Author	113
Professional Aviation Series from ASA	115

Chapter 1

Taking the First Step

The root of mental math proficiency lies in the ability to grasp the basic concepts of addition, subtraction, multiplication, and division. The skill level you achieve is simply a reflection of how much work, or repetition, that you put into it. Starting now, in your everyday activities of paying for gas or groceries, giving an allowance to your kids, keeping track of sports statistics or scores, or calculating how much fuel to put in your aircraft, try to do all of them in your head. A good starting point is to write the numbers (or formulas) on a piece of paper, study how you solve the problem, and then push the paper aside and repeat the problem by visualizing what you have just completed. This takes a little extra time and discipline, but repetition and effort is as necessary here as it is with any other skill.

When you discover that you need to calculate a solution to a math problem, first define the problem; i.e., what is the answer you need? Second, look for the right formula to use. Most of the formulas you will ever need are right here in this book. Third, rearrange the formula to solve for the answer that you need. And, fourth, plug in the numbers and solve.

The same is true of the problems in this study guide. If you need to first complete the problems with pen and paper, do it! Once you've completed the problem, set the paper aside and repeat the problem in your head until you feel comfortable that you can repeat the solution in a timely manner without cheating.

Many of the subject areas in this book will have practice questions. The answers are in Chapter 7. In addition, there is a comprehensive test in Chapter 5 that will include different problems from all study areas. For all problems, try to be as accurate as possible. If you feel you need additional problems to solve, create some on your own. In fact, it will help increase your proficiency in solving problems to create your own problems.

I cannot overemphasize the importance and significance of having solid basic math skills. In most careers, having a slightly better-than-average skill will produce a noticeable increase in performance. That same philosophy is true in mental math skills for pilots. Therefore, Appendix A is available for extra study to review the basic concepts and techniques for solving simple and more complicated math problems we encounter while flying.

In Appendix A, the math skills that are reviewed include addition, subtraction, multiplication, division, squares, and square roots. In addition, there

are problems to demonstrate simple and complex levels of proficiency, as well as practice problems for you to work.

The pilot population as a whole is no different in their math proficiency than in any other industry. Individual proficiency varies greatly. The remainder of this study guide relies on your ability to demonstrate basic math proficiency in order to understand and use the techniques and develop the skills necessary to increase your performance in the cockpit. Therefore, I challenge you to review and assess your own math problem-solving skills, and make a commitment to study Appendix A. If you are a new pilot your future employment may be at stake! If you are a seasoned veteran, your cockpit efficiency may improve significantly!

As a professional pilot you recognize the need to be at your top level of proficiency every time you fly. The preflight activities of flight planning, reviewing the weather, and checking the NOTAMs are a legal requirement of every flight. However, the pilot skills you demonstrate are a reflection of the basic math skills and techniques you develop in a disciplined and focused strategy of study. This study guide is designed to help you be a more professional pilot!

Study well. Good luck!

From the people who brought you *Checklist for Success* and *Airline Pilot Technical Interviews*
Here's another *must have* study guide guaranteed to improve your performance in
your airline interview and in your everyday flying!

Mental Math for Pilots

In this book you'll learn the tricks of the trade for the areas where pilots have traditionally needed to sharpen their mental math skills: fuel planning, temperature conversions, reciprocal headings, turn radius, crosswind components, time-speed-distance problems, calculating true airspeed, the 60-to-1 rule, and many others. Rather than asking, "What's it doing now?" you will stay ahead of the flight with cockpit tools you can use to assist you in planning the flight. Mental math tools and short cuts allow you to fly and navigate better and more efficiently. And on top of all that, these skills help you perform your best in the airline interview.

In this era of EFIS, FMC, GPS, and "fly by wire" aircraft, the most important cockpit 'computer' is still the mind of the pilot. Mental Math revs up the brainpower to quickly process not only those pesky math questions asked during airline interviews, but expands the mental hard drive to handle a wide range of practical number problems in flight. Learn Ron's techniques and you just might be able to leave the calculate mode in permanent off!

Wayne Phillips
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Since 1976, Ron McElroy has flown in nearly every area of aviation. He's been an Air Force test pilot, flight and ground instructor, charter pilot, skydive pilot, photo and chase pilot, and line pilot for two airlines. In 1997, Ron added Cage Consulting Technical Consultant to his extensive list of aviation accomplishments. In 1998 Ron wrote his first book, *Airline Pilot Technical Interviews*.



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