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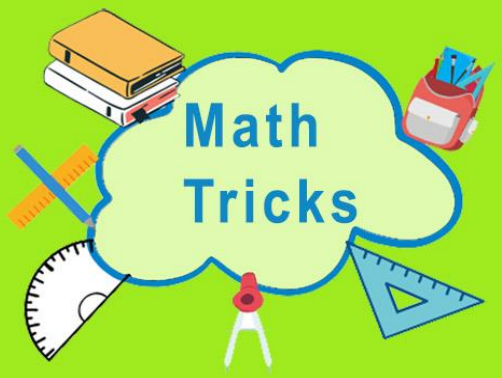
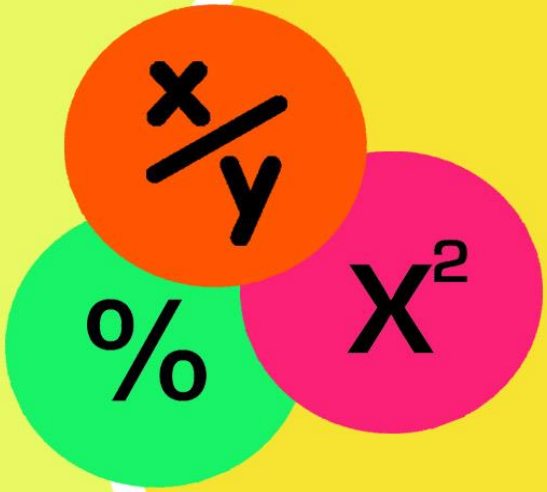


Mental Math Tricks

Vedic Math Tricks

Singapore Math Tricks



2

Elementary Mathematics Book

Intermediate Skills

AMC, MATHCOUNTS
TMSCA, and Math Olympiad

Contains

* Three Digit Multiplication, Find Average, Divisibility Rules, Percentage and Consecutive Numbers
* Practice on individual topics
* Model test papers

Ice Venkatesh
TMSCA Medalist

Elementary Mathematics: Intermediate Skills (Book 2)

Mathematics Intermediate concepts that strengthen mathematical foundation for TMSCA, AMC, MATHCOUNTS and Math Olympiad

By: Ice Venkatesh
Author and Founder of Vibba LLC

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https://Vibba.com

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Editor: Arti Venkatesh

I am dedicating my second Mathematics book to the Head of my School,

Mr. Bill Delbrugge
Head of The Village School

THE VILLAGE SCHOOL
A NORD ANGLIA EDUCATION SCHOOL
Houston TX USA

Acknowledgments

This book would not have been possible without the unwavering support of The Village School, whose belief in my vision has fueled my journey. Their encouragement has empowered me to share my passion for mathematics with young learners everywhere.

I am deeply grateful to my parents, Arti/Murali Venkatesh, for always inspiring me to pursue my dreams with determination and joy and encouraged me to explore my creativity.

A heartfelt thank you to the incredible mentors and educators who have guided me, sparking my love for mathematics and problem-solving. Your support has shaped my journey, and I am forever thankful.
To my friends at The Village School—you are my constant source of inspiration. Your curiosity, perseverance, and camaraderie remind me every day that together, we can transform the way the world sees math!

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Foreword by Shannon Durocher

Middle School Math Teacher & TMSCA Coach at The Village School

Math competitions, especially TMSCA meets, can be challenging and require quick thinking, problem-solving skills, and a lot of tricks with number sense. As one of our school's TMSCA coaches, I've had the privilege of seeing students, like Ice Venkatesh, take their knowledge and apply it to complex mathematical problems.

I had the pleasure of being part of The Village Middle School TMSCA team last year with Ice, and it's been inspiring to watch her continue her journey. Even after moving on to high school, she's embraced her passion for mentoring our middle school team members. One thing that stands out about Ice is her incredible talent for breaking down number sense problems into simple, clear steps, making even the toughest concepts stick with our students. Watching her lead is like watching someone effortlessly share their gift with others.

Ice's dedication to helping others doesn't stop with coaching. She's gone above and beyond by organizing math workshops during holiday breaks and committing her summers and winters to writing books. I mean, how many students, let alone adults, can say they wrote not one, but two books over their breaks? When asked, "What did you do over summer?" most people wouldn't answer with, "I wrote a book!" But Ice can. It's truly awe-inspiring.

There's more to Ice than just books and math. She tutors middle schoolers in general math courses, and the payment for her services goes directly toward her nonprofit foundation, Lemonade with Ice, which supports and empowers young girls worldwide through education. Her heart for giving back is remarkable.

There's no limit to what Ice can do, and the good she continues to bring to the world is nothing short of incredible. May you find the number sense tricks she shares with you simply another tool to add to your growing mathematical toolkit and may her dedication to excellence inspire you as much as it inspires me.

Introduction

This book is perfect for middle school students who want to excel in and enjoy mathematics. It is designed to enhance problem-solving and critical-thinking skills in a fun and engaging way.

To make learning math more accessible and enjoyable, various innovative methods have been developed, such as Vedic Mathematics, Singapore Mathematics, and Mental Mathematics. These approaches are widely taught in different countries, each offering unique benefits. *Intermediate Skills* is an easy-to-learn book that strengthen mathematical concepts and techniques from these methods.

This is the second book in a series of five, progressively increasing in difficulty. The math tricks and strategies in this book become more challenging and are ideal for 5th-grade students or anyone learning at a fifth-grade level.

Vedic Mathematics

Vedic Mathematics is an ancient system of Indian mathematics that consists of a set of techniques or "sutras" (aphorisms) to solve mathematical problems in a more straightforward and faster way. These techniques are derived from ancient Indian texts known as the Vedas, specifically the "Atharvaveda". The system was popularized in the 20th century by Jagadguru Swami Bharati Krishna Tirthaji Maharaj, who authored a book titled "Vedic Mathematics" in 1965, which compiled 16 sutras (formulas) and 13 sub-sutras (sub-formulas) that cover a wide range of mathematical concepts.

Key Features of Vedic Mathematics

Simplicity and Speed: The methods in Vedic Mathematics are designed to be simple and enable quick calculations. The concepts are very efficient compared to conventional methods, especially for algebra, geometry, and higher levels.

Versatility: The techniques can be applied to a variety of mathematical problems, including addition, subtraction, multiplication, division, square roots, cube roots, algebraic equations, and complex calculations.

Mental Calculation: Vedic Mathematics emphasizes mental math techniques, encouraging the user to perform calculations in their head without the need for paper or calculators.

Flexibility: There are often multiple ways to solve a problem using Vedic methods, providing flexibility, and encouraging creative approaches.

Pattern Recognition: Vedic Mathematics often involves recognizing patterns and using them to simplify complex calculations. For instance, certain multiplication techniques involve specific patterns that reduce the complexity of the calculation.

Vedic Math Example:

One Vedic Mathematics technique is called “Ekadhikena Purvena,” which means “one more than the previous one.” This is particularly useful for finding squares of numbers ending in 5. For example, to find the square of 15:

Take the number before 5, which is 1.
Add 1 to it, so 1 + 1 = 2.
Multiply this sum by the original number before 5, so 2 x 1 = 2.
Write 25 at the end. The result is 225.
So, $15^2 = 225$.

Singapore Mathematics

Singapore Mathematics, similar to Vedic Mathematics, focuses on efficiency and understanding and is a teaching method that originates from the national mathematics curriculum of Singapore. It is recognized for its clear and structured approach which aims to develop student's mathematical abilities and problem-solving skills. Here is a brief overview:

Conceptual Understanding: Singapore Math emphasizes a deep understanding of core mathematical concepts rather than rote memorization of procedures.

CPA Approach: It implies the Concrete-Pictorial-Abstract (CPA) approach, where students first use tangible objects to understand a concept (Concrete), then represent these concepts with pictures or diagrams (Pictorial), and finally use mathematical symbols to express the concepts (Abstract).

Problem Solving: Students are taught to solve problems in several ways, using model drawing, number bonds, and mental calculations.

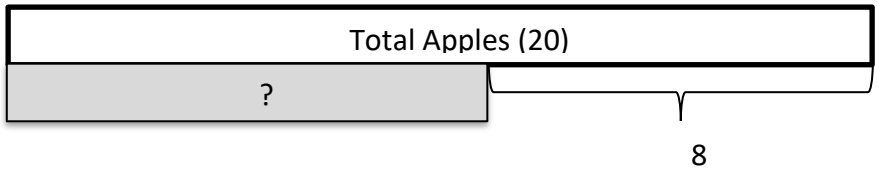
Mastery: The curriculum is designed for students to achieve mastery of a topic before moving on to more complex ideas.

Both Vedic and Singapore Mathematics encourage mental calculation and a deeper understanding of mathematical principles, but they differ in their origins, cultural context, and specific techniques used for teaching and learning mathematics. Singapore Math is adopted in various countries for its effectiveness in teaching mathematics to young learners.

Singapore Math Example:

Singapore Mathematics often uses model drawing to solve word problems. For instance, if a problem states that John has 20 apples and gives away 8, how many does he have left? A Singapore Math approach would be to draw a bar model:

Draw a bar and split it into two parts.
Label one part with 20 (total apples) and the other part with 8 (apples given away).
Subtract the second part from the first to find the answer.
John has 20 – 8 = 12 apples left.



Mental Mathematics:

Mental Mathematics, also known as mental math or mental arithmetic, is the ability to perform mathematical calculations in your head without the use of paper, pencil, or a calculator. It involves using various techniques and strategies to solve math problems quickly and accurately. Here are some key aspects of Mental Mathematics:

Number Sense: Developing a strong understanding of numbers and their relationships.

Mental Strategies: Using techniques like breaking down problems, rounding numbers, and using known facts to simplify calculations.

Practice: Regular practice to improve speed and accuracy in mental calculations.

Applications: Useful in everyday situations like calculating tips, making quick estimates, and solving problems on the spot.

Mental Mathematics is similar to Vedic and Singapore Mathematics and it emphasizes mental agility and efficient problem-solving. It is a valuable skill that can enhance overall mathematical understanding and confidence.

Mental Math Example:

A mental math strategy for multiplication is to break numbers into easier chunks. For example, to find the product of 14 and 5:

Multiply 10 by 5 to get 50.
Multiply 4 by 5 to get 20.
Add the two results together: 50 + 20 = 70.
So, 14 × 5 = 70

Preparation for State and National Math Competitions

TMSCA (Texas Math and Science Coaches Association) books are designed to help students excel in math competitions by covering a wide range of problem-solving techniques and concepts. These books can be effectively used for other state math exams and competitions across the U.S. Here's how:

Overlapping Math Topics with Other State Exams

Many state math competitions and standardized tests share similar topics with TMSCA books, including:

Number Sense: Mental math tricks, estimation, and quick calculations.

General Mathematics: Algebra, geometry, probability, and statistics.

Calculator Applications: Speed-based problem-solving, similar to UIL and other state competitions.

These topics are **commonly tested** in competitions like:

- American Mathematics Competitions (AMC) 8 & 10 – National
- MATHCOUNTS – National
- Math Olympiads for Elementary and Middle Schools (MOEMS) - Multiple States
- University Interscholastic League (UIL) – Texas State

Preparation for National Competitions

If a student uses **TMSCA books** to prepare, they are also indirectly preparing for:

- **AMC 8 & 10**: Algebra, number theory, and combinatorics overlap with TMSCA problem sets.
- **MATHCOUNTS**: Fast-paced problem-solving skills developed through TMSCA training are useful.
- **MOEMS 7 UIL:** Problem-solving techniques in TMSCA books help with logical reasoning problems in MOEMS contests.

TMSCA Mathematics books are not just for Texas competitions—they are versatile resources that can help students succeed in various math contests across the U.S. By adapting the problem-solving strategies and concepts, students can excel in other state exams, national competitions, and even standardized tests!

Comparison Table for AMC, MOEMS, and TMSCA

Feature	AMC	MOEMS	TMSCA
Target Grades	Middle & High School (AMC 8, 10, 12)	Elementary & Middle School (Grades 4-8)	Elementary & Middle School (Texas-based)
Exam Format	Multiple-choice, individual test	Short-answer, problem-solving questions	Multiple-choice & problem-solving
Subjects Covered	Algebra, Geometry, Number Theory, Combinatorics	Logic, Number Sense, Geometry, Algebra	Number Sense, General Math, Calculator, Science
Difficulty Level	Moderate to Very Challenging	Moderate	Moderate to Challenging
Frequency	Once a year (AMC 8, 10, 12)	Five contests per year	Several meets throughout the year
Scoring System	Raw score based on correct answers	Points awarded per correct solution	Varies by contest type
Team Component	Individual competition (some team-based at higher levels)	Team-based competition	Individual & Team events
Purpose	Prepares for advanced math contests like AIME, USAMO	Encourages problem-solving & logical thinking	Strengthens math & science skills, prepares for UIL
Geographic Scope	National & International	National (U.S.-based)	Texas-specific

Breakdown of the Skills Required for AMC, MOEMS, and TMSCA at the Middle School Level

Mathematical Skill	AMC	MOEMS	TMSCA
Number Sense	Prime numbers, divisibility, LCM/GCD, fractions, decimals	Mental math tricks, estimation, properties of numbers	Speed calculations, prime factorization, fractions, decimals
Algebra	Expressions, equations, inequalities, exponents, sequences	Simple equations, patterns, logical reasoning	Variables, equations, functions, exponents
Geometry	Angles, triangles, circles, polygons, coordinate geometry	Basic geometry, area/perimeter, transformations	2D & 3D figures, Pythagorean theorem, volume & surface area
Combinatorics & Probability	Counting principles, permutations, combinations, probability	Logical problem-solving, simple probability	Probability, arrangements, permutations
Word Problems & Logical Thinking	Complex multi-step word problems, rate-time-distance problems	Logical reasoning, multi-step word problems	Translating word problems into equations, applied logic
Graphing & Coordinate Geometry	Slope, distance, midpoint, transformations	Basic coordinate plotting	Coordinate plane, transformations, symmetry
Measurement & Units	Unit conversion, rate problems	Length, weight, time conversions	Customary & metric unit conversions
Math Strategies	Estimation, process of elimination, time management	Systematic problem-solving, working backwards	Speed and accuracy in calculations

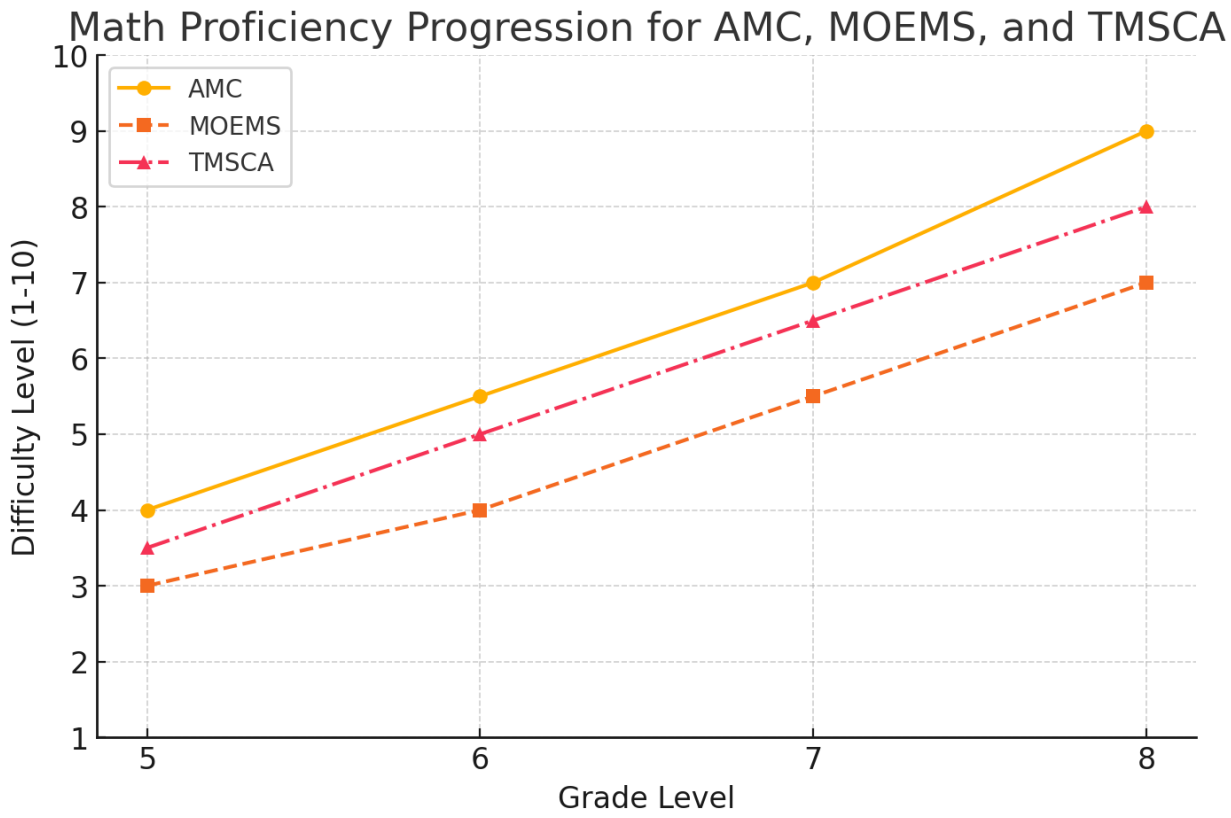
Each test emphasizes different skills:

- AMC focuses on advanced problem-solving & algebraic reasoning.
- MOEMS emphasizes logical thinking & creative problem-solving.
- TMSCA requires speed & accuracy in computations across multiple areas.

Graph Showing the Difficulty Progression of Math Proficiency Required for AMC, MOEMS, and TMSCA from 5th to 8th grade

Graph Explanation:

- X-axis: Grade Level (5th to 8th)
- Y-axis: Difficulty Level (Basic → Advanced)
- Each line represents a different competition (AMC, MOEMS, TMSCA).
    - MOEMS starts easier and progresses moderately.
    - TMSCA has a steady increase in computational difficulty.
    - AMC shows the steepest curve as it prepares students for advanced contests.



Here is the graph showing the math proficiency progression required for AMC, MOEMS, and TMSCA from 5th to 8th grade.

- **AMC** has the steepest difficulty increase, preparing for advanced contests.
- **MOEMS** progresses moderately, focusing on logical problem-solving.
- **TMSCA** steadily increases in complexity, emphasizing speed and accuracy.

Elementary Mathematics Book Series: Path to Expert

This book, the second book of the five-book series focuses on Intermediate Skills. It will continue to build on mathematic tricks that you learned in the first book.

Focus area	Book 1 Core Skills (4th Grade)	Book 2 Intermediate Skills (5th Grade)	Book 3 Competent Skills (6th Grade)	Book 4 Advanced Skills (7th Grade)	Book 5 Expert Skills (8th Grade)
Addition					
Subtraction					
Multiplication					
Table					
Division					
Percentage					
Fraction					
Ratio					
Average					
Square					
Square Root					
Cube					
Cube Root					
Union					
Factors					
Sequence					
Distance and Time					
Number Theory					
Algebra					
Complement					
Arithmetic series					
Arithmetic Progression					
Geometry					
SohCahToa					
Diagonals					
Quadratic					
Base					
Conversion					
Quotient					
Trigonometry					
Logical Reasoning					
Precalculus					

Each book will give an easy step-by-step approach so that you can understand and memorize how to solve these Mathematics tricks, covering various Mathematics topics and easy-to-master tricks from Vedic Math, Singapore Math, and Mental Math areas.

How to Use Intermediate Skills (Book 2)

Elementary Mathematics: Intermediate Skills (Book 2) is designed for **intermediate learners** looking to strengthen their mathematical foundation and develop advanced problem-solving strategies. It builds on the concepts introduced in *Elementary Mathematics: Core Skills (Book 1)* and takes students deeper into essential math techniques.

Start with Book 1 for a Strong Foundation

This book is a continuation of *Elementary Mathematics: Core Skills (Book 1)*. Students who have completed Book 1 will find it easier to understand the concepts taught here. If you are new to this series, we recommend reviewing Book 1 first to build a strong foundation in fundamental math skills before progressing to intermediate-level topics.

To get the best learning experience, follow these steps:

- The book is divided into sections, with each section dedicated to explaining concepts that are either similar or help solve similar types of problems. This organization allows for a coherent and logical progression through various mathematical topics, making it easier for students to build on their knowledge as they advance.
- Each section encompasses multiple tricks, each designed to simplify and elucidate complex mathematical problems.
- To reinforce learning, every trick is accompanied by two examples. These examples provide a visual and practical understanding of the trick, demonstrating its application and effectiveness.
- To ensure that students can apply the concepts independently, each trick is followed by five practice problems. These problems are carefully crafted to reinforce the trick and provide ample practice.
- At the end of each section, there is a comprehensive quiz covering all the tricks taught within that section. This quiz serves as an assessment tool, allowing students to review and consolidate their understanding of the material.

Importance of this Book

Math is indeed a foundational subject with a wide array of benefits. It helps develop critical thinking and problem-solving skills, which are essential for academic success but also for navigating everyday life. Here are some ways math skills are applied in daily life:

1. **Critical Thinking:** Math teaches logical reasoning and the ability to approach problems methodically.
2. **Problem-Solving:** Mathematical problems often require identifying patterns, making connections, and applying known methods to new situations.
3. **Attention to Detail:** Solving math problems accurately requires careful attention to detail and precision.
4. **Perseverance:** Working through challenging problems builds resilience and persistence, valuable traits in life.
5. **Practical value:** By incorporating math into everyday activities and other academic subjects, kids can see its practical value and develop a stronger appreciation for the subject.

Who will benefit from this book?

This book is designed to benefit a wide range of students, from those who are just beginning to learn foundational math concepts to those who have developed a passion for mathematics and are looking to prepare for math competitions. It provides a comprehensive and structured approach to learning that caters to the diverse needs and abilities of young learners.

For Intermediate Learners

For student who have a basic understanding of mathematical concepts and are ready to take their skills to the next level. It is ideal for students looking to strengthen their problem-solving abilities, improve their speed and accuracy, and build a solid foundation for more advanced topics.

For Advanced Learners

For students who have already developed a strong interest in mathematics, this book serves as a valuable resource to deepen their understanding and enhance their skills. Advanced learners will find challenging problems and sophisticated techniques that push the boundaries of their knowledge and abilities.

Preparing for Math Competitions

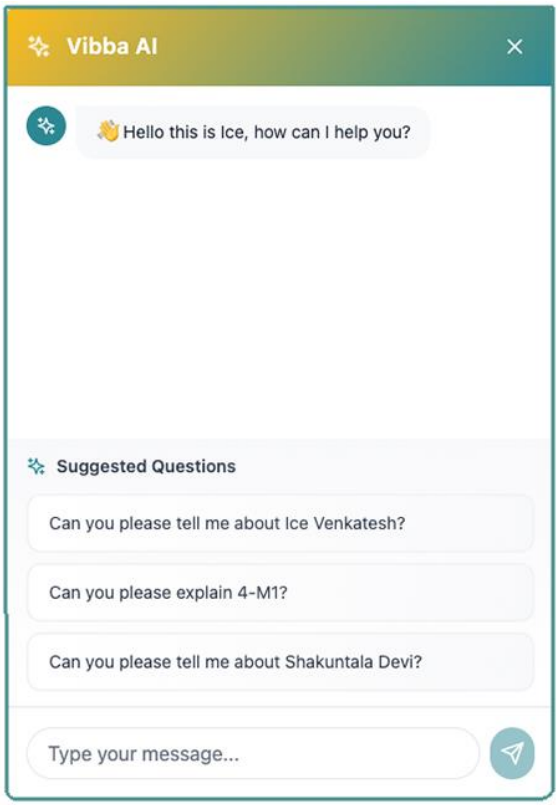
This book is an indispensable tool for students aspiring to excel in math competitions. It includes a variety of problem-solving strategies, tips, and tricks that are commonly used in competitive math. The exercises and problems are designed to simulate the types of

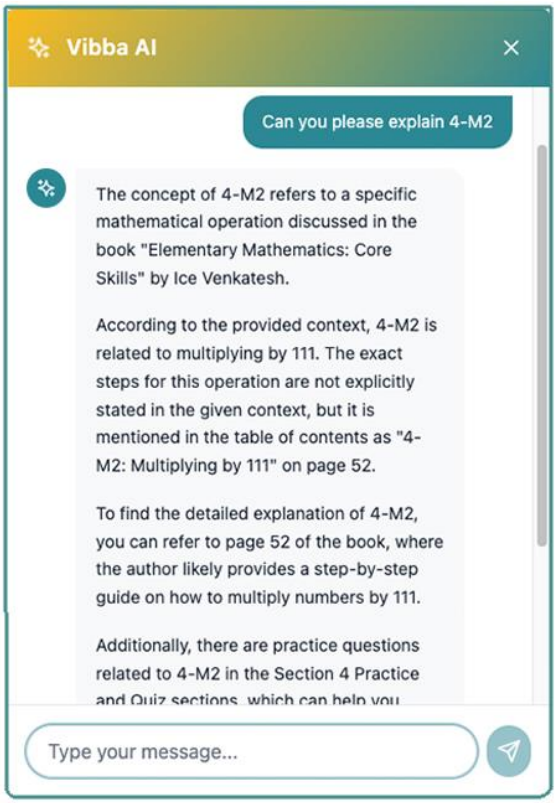
questions encountered in competitions, providing students with ample practice and exposure.

Personalized Learning Assistance: Vibba AI Bot

Vibba has introduced the Vibba AI Bot, a personalized assistant designed to enhance students' math learning journey. By offering tailored practice problems, real-time feedback, and interactive challenges based on Elementary Mathematics Book 1: Core Skills, the AI Bot helps students build their skills at their own pace. It's particularly useful for those preparing for competitive exams, ensuring a more engaging and efficient way to master math concepts. The bot adapts to students' learning paces and provides engaging challenges, like math quizzes and famous mathematician trivia, to keep learning fun. It also offers immediate error correction and encourages critical thinking, making it a valuable tool for preparing for competitions like TMSCA and Math Olympiad.

You can access Vibba AI Bot at https://vibba.com/ai_assistant/





In-depth Online Classes

Elementary Mathematics: Intermediate Skills (Book 2) is designed for students who want to strengthen their mathematical foundation and enhance their problem-solving abilities. Mathematics is a key component of STEM (Science, Technology, Engineering, and Mathematics) education, and developing strong skills at this stage helps students build confidence and prepare for more advanced concepts in the future.

This book introduces a variety of innovative problem-solving techniques that make learning math more engaging and effective. It covers essential strategies, including mental math shortcuts and logical approaches, to help students tackle complex problems with ease. These methods not only improve computational speed but also encourage analytical thinking, which is crucial for success in mathematics and beyond.

To further support students, we offer in-depth online classes through our website, Vibba.com. These classes provide step-by-step guidance on mastering math tricks and concepts, making it easier for students to apply what they learn in real-world scenarios. Whether preparing for competitive math contests like TMSCA, AMC, MATHCOUNTS, Texas Math League and Math Olympiad or simply looking to excel in school, this book and our online resources will give students the tools they need to succeed.

With a structured approach, engaging exercises, and expert guidance, *Elementary Mathematics: Intermediate Skills (Book 2)* empowers students to take their math skills to the next level.

Additional Resources

Answer sheets for all practice problems and section quizzes are provided at the end of the book. For further convenience and support, these answer sheets are also available on the Vibba website (Vibba.com). This dual availability ensures that students and educators have easy access to the answers, facilitating a smooth learning and teaching experience.

Section 2-1

2-1-M1: Multiplying by 16 2/3

When:

Multiplying a number by $16\frac{2}{3}$

How:

1. Divide the non-16 number by 6.
2. Add two zeroes to the answer.
3. That is the answer to the equation.

Visual Flow:

Start
Problem: $16\frac{2}{3} \times 36$=?
↓
Step 1: Divide the non-$16\frac{2}{3}$ by 6. $36 \div 6 = 6$
↓
Step 2: Add two zeroes. $600=16\frac{2}{3} \times 36$
↓
End

Figure 1: 2-1-M1: Multiplying by 16 2/3

Example and Practice Questions

Example 1	Practice Questions
Problem: $16\frac{2}{3} \times 72 = ?$ Step 1: 72 / 6 =12 Step 2: 1200 Answer: $16\frac{2}{3} \times 72 = 1200$	1. $16\frac{2}{3} \times 48 =$ 2. $120 \times 16\frac{2}{3} =$ 3. $12 \times 16\frac{2}{3}\% =$ 4. $16\frac{2}{3}\% \times 24 =$ 5. $84 \times 16\frac{2}{3} =$
Example 2	
Problem: $16\frac{2}{3}\% \times 60 = ?$ Step 1: 60 / 6 = 10 Step 2: 1000 Answer: $16\frac{2}{3}\% \times 60 = 1000$	

Table 1: 2-1-M1: Multiplying by 16 2/3

2-1-M2: 3-Digit by 3-Digit Multiplication

When:

Multiplying two 3-digit numbers

How:

1. The first digit of the answer is the product of the units' digits.
2. The second digit is the product between tens and units' digits plus carryover.
3. The third digit is the product between hundreds and units' digits, the product of the tens digits plus carryover.
4. The fourth digit is the product between hundreds and tens digits plus carryover.
5. The fifth/sixth digit is the product between the hundred digits plus the carryover.
6. That is the answer.

Visual Flow:

Start
Problem: 452 × 371 =?
Step 1: Product of the units 2 × 1 = 2 Write down 2
Step 2: Cross Multiplication between units and tens 5 × 1 = 5 & 7 × 2 = 14 5 + 14 = 19 Write down 9, Carry over 1
Step 3: Multiplication between hundreds and units plus product of tens and carryover 4 × 1 = 4 & 3 × 2 = 6 & 5 × 7 = 35 4 + 6 + 35 + 1 = 46 Write down 6, carryover 4
Step 4: Multiplication between hundreds and tens plus carryover 4 × 7 = 28 & 3 × 5 = 15 28 + 15 + 4 = 47 Write down 7, carryover 4
Step 3: Multiplication between hundreds digits plus carryover 4 × 3 = 12 12 + 4 = 16 Write down 16.

Answer: 452 × 371 = 167692
End

Figure 2: 2-1-M2: 3-Digit by 3-Digit Multiplication

Example and Practice Questions

Example 1	Practice Questions
Problem: 123 × 456 =? Step 1: 3 × 6 = 18 Step 2: 2 × 6 = 12 & 3 × 5 = 15 Step 3: 15 + 12 + 1 = 28 Step 4: 1 × 6 = 6, 3×4 = 12, 2 × 5 = 10 Step 5: 6 + 12 + 10 + 2 = 30 Step 6: 1 × 5 = 5 & 2×4 = 8 Step 7: 5 + 8 + 3 = 16 Step 8: 1 × 4 = 4 Step 9: 4 + 1 = 5 Answer: 123 × 456 = 56088	1. 567 × 891 = 2. 345 × 678 = 3. 910 × 231 = 4. 782 × 367 = 5. 653 × 478 =
Example 2	
Problem: 789 × 234 =? Step 1: 9 × 4 = 36 Step 2: 8 × 4 = 32, 9 × 3 = 27 Step 3: 32 + 27 + 3 = 62 Step 4: 7 × 4 = 28, 2 × 9 = 18, 8×3 = 24 Step 5: 28 + 18 + 24 + 6 = 76 Step 6: 7 × 3=21, 8 × 2 = 16 Step 7: 21 + 16 + 7 = 44 Step 8: 7 × 2 = 14 Step 9: 14 + 4 = 18 Answer: 184626	

Table 2: 2-1-M2: 3-Digit by 3-Digit Multiplication

When:

Finding the product of a 2-digit and a 3-digit number

How:

1. Find the product of unit digits.
2. Find the product between units and tens digits plus any carryover.
3. Multiply the first two digits of the three-digit number by the two-digit number plus any carryover.
4. Multiply the first digits in both numbers plus any carryover.
5. Write the final answer.

Visual Flow:

Start
Problem: 23 × 456 =?
↓
Step 1: Find the product of unit's digits. 3 × 6 = 18 Write the 8, carryover 1.
↓
Step 2: Find the product of units and tens digits plus carryover. 5 × 3 = 15, 2 × 6 = 12 15 + 12 + 1 = 28 Write the 8, carryover 2
↓
Step 3: Cross multiply the first two digits of both numbers. 4 × 3 = 12, 5 × 2 = 10 12 + 10 + 2 = 24 Write the 4, carryover 2
↓
Step 4: Multiply the first digit of both numbers. 2 × 4 = 8 8 + 2 = 10
↓
Answer: 23 × 456 = 10488
End

Figure 3: 2-1-M3: 2-Digit by 3-Digit Multiplication

Example and Practice Questions

<table>
<tr><th>Example 1</th><th>Practice Questions</th></tr>
<tr><td>Problem: 18 × 231 =?
Step 1: 8×1=8
Step 2: 1×1=1 & 8×3=24
Step 3: 24 + 1 = 25
Step 4: 1×3=3 & 8×2=16
Step 5: 16 + 3 + 2 = 21
Step 6: 1×2=2
Step 7: 2 + 2 = 4
Answer: 18 × 231 = 4158</td><td rowspan="2">1. 53 × 276 =
2. 527 × 64 =
3. 943 × 35 =
4. 28 × 504 =
5. 673 × 92 =</td></tr>
<tr><th>Example 2</th></tr>
<tr><td>Problem: 489 × 72 =?
Step 1: 9×2=18
Step 2: 8×2=16 & 9×7=63
Step 3: 16 + 63 + 1 = 80
Step 4: 4×2=8 & 8×7=56
Step 5: 8 + 56 + 8 = 72
Step 6: 4×7=28
Step 7: 28 + 7 = 35
Answer: 489 × 72 = 35208</td><td></td></tr>
</table>

Table 3: 2-1-M3: 2-Digit by 3-Digit Multiplication

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Useful Links

Number	Description	Website address
1.	Vibba	https://Vibba.com
2.	Vibba AI Chat Bot	https://vibba.com/ai_assistant
3.	TMSCA	https://www.tmsca.org
4.	Mathematical Olympiad	https://moems.org
5.	The International Mathematical Olympiad (IMO)	https://www.imo-official.org
6.	American Mathematics Competitions	https://maa.org/student-programs/amc/
7.	Lemonade With Ice Charity	https://lemonadewithice.org

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About The Author

Ice Venkatesh, a recognized state medalist, has excelled in her own academic and professional pursuits. She is a member of Mu Alpha Theta, National High School and Two-Year College Mathematics Honor Society. She mentors numerous students to achieve top honors in prestigious mathematics competitions and examinations. Her unwavering dedication, passion, and expertise make her a valuable asset to the educational community, where she strives to ensure every student receives the highest quality instruction and support needed to succeed.

Ice has combined her profound knowledge of Singapore, Vedic, and Mental Math into this comprehensive book series. This initiative is designed to provide students with a solid foundation in essential mathematical concepts that are crucial for their academic journey. This is the second book in the series, continues to build on the fundamental principles of math, aligning with the curriculum requirements and preparing students for competitive math events such as the AMC (American Mathematics Competitions), TMSCA (Texas Math and Science Coaches Association), MATHCOUNTS, and the Math Olympiad.

Ice is helping The Village School as a Teacher's Assistant (TA) for the mathematics department. She loves teaching math, cultivating problem-solving skills, and building the confidence necessary for students to excel in academic areas. Her work in this book series is an extension of her lifelong mission to nurture young minds and guide them toward success.

Ice is deeply committed to advancing educational opportunities for young girls, particularly in the fields of STEM, recognizing the importance of empowering young girls to pursue their academic goals. She founded a non-profit organization, Lemonade with Ice, dedicated to this cause. Through this organization, she has established a comprehensive scholarship program that provides financial support, resources, and mentorship to young girls, ensuring they have access to quality education. This scholarship program is designed to assist with educational expenses and encourage girls to pursue careers in STEM, fostering a new generation of female leaders. Ice's work through the non-profit reflects her lifelong commitment to gender equality in education and her belief in the transformative power of learning.

To learn more about this impactful initiative and how you can support the cause, please visit LemonadewithIce.org.

For more information about personalized math learning and the tailored educational programs offered, please visit Vibba.com