ELEMENTARY MATH GUIDE

Basic Arithmetic for Grades 4-6

Master the fundamentals that every student needs

Global Sovereign University

Building a Bridge to Freedom Through Education

How to Use This Guide

This workbook covers essential math skills for grades 4-6. Each section builds on the previous one, so work through them in order. Practice every problem—repetition builds mastery.

Study Tips:

• Work without a calculator to build mental math skills

• Show all your work—it helps you find mistakes

• Check answers with the Answer Key at the end

• Review sections where you made errors before moving on

Table of Contents

Section 1: Place Value

Understanding place value is the foundation of all math. Each digit in a number has a value based on its position.

The Place Value Chart

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
1,000,000	100,000	10,000	1,000	100	10	1

Example: In the number 4,523,867:

• The 4 is in the millions place (value: 4,000,000)

• The 5 is in the hundred thousands place (value: 500,000)

• The 2 is in the ten thousands place (value: 20,000)

• The 3 is in the thousands place (value: 3,000)

• The 8 is in the hundreds place (value: 800)

• The 6 is in the tens place (value: 60)

• The 7 is in the ones place (value: 7)

Expanded Form

Expanded form shows a number as the sum of each digit's value.

Example: 5,432 = 5,000 + 400 + 30 + 2

Comparing Numbers

To compare numbers, start at the leftmost digit and compare place by place.

• > means 'greater than' (5 > 3 means 5 is greater than 3)

• < means 'less than' (2 < 7 means 2 is less than 7)

• = means 'equal to'

Rounding Numbers

Rule: Look at the digit to the RIGHT of the place you're rounding to.

• If it's 5 or more, round UP

• If it's 4 or less, round DOWN

Example: Round 3,847 to the nearest hundred → Look at the tens digit (4). Since 4 < 5, round down: 3,800

Practice: Place Value

1. In 7,294,518, what digit is in the ten thousands place? _____

2. What is the value of the 6 in 562,403? _____

3. Write 8,045 in expanded form: _____

4. Compare: 45,678 ■ 45,687 (write <, >, or =)

5. Round 6,752 to the nearest hundred: _____

6. Round 34,567 to the nearest thousand: _____

Section 2: Addition

Addition combines numbers to find a total (sum). When adding multi-digit numbers, line up the place values and add column by column from right to left.

Adding with Regrouping (Carrying)

When a column adds up to 10 or more, write the ones digit and carry the tens digit to the next column.

Example: 467 + 285

467

+ 285

Step 1: Ones column: 7 + 5 = 12 → Write 2, carry 1

Step 2: Tens column: 1 + 6 + 8 = 15 → Write 5, carry 1

Step 3: Hundreds column: 1 + 4 + 2 = 7

Answer: 752

Adding Larger Numbers

Example: 4,567 + 2,845

4,567

+ 2,845

7,412

Mental Math Strategy: Make Tens

To add quickly, look for numbers that make 10. Example: 8 + 7 = 8 + 2 + 5 = 10 + 5 = 15

Practice: Addition

Solve each problem. Show your work.

1) 456 + 378 =

2) 892 + 567 =

3) 1,234 + 5,678 =

4) 3,456 + 2,789 =

5) 12,345 + 8,765 =

6) 45,678 + 23,456 =

7. A school has 1,245 students. Next year, 387 new students will enroll. How many students will there be? _____

8. Maria saved $2,456. She earned $1,875 more. How much does she have now? _____

Section 3: Subtraction

Subtraction finds the difference between numbers. When subtracting multi-digit numbers, line up place values and subtract column by column from right to left.

Subtracting with Regrouping (Borrowing)

When the top digit is smaller than the bottom digit, borrow 1 from the next column to the left.

Example: 532 - 287

532

- 287

Step 1: Ones: Can't take 7 from 2. Borrow from tens: 12 - 7 = 5

Step 2: Tens: 2 (was 3) - 8? Can't. Borrow from hundreds: 12 - 8 = 4

Step 3: Hundreds: 4 (was 5) - 2 = 2

Answer: 245

Subtracting Across Zeros

Example: 500 - 267

When you need to borrow from a zero, keep moving left until you find a digit to borrow from.

500 → 4 hundreds, 10 tens → 4 hundreds, 9 tens, 10 ones

Then subtract: 500 - 267 = 233

Checking Your Work

Add your answer to the number you subtracted. It should equal the original number.

Check: 245 + 287 = 532 ✓

Practice: Subtraction

1) 745 - 368 =

2) 903 - 456 =

3) 1,000 - 573 =

4) 5,432 - 2,876 =

5) 10,000 - 4,567 =

6) 23,456 - 8,789 =

7. A store had 2,500 items. They sold 1,847 items. How many remain? _____

8. Tom has $5,000. He spends $2,375. How much does he have left? _____

Section 4: Multiplication

Multiplication is repeated addition. Knowing your times tables (1-12) by heart is essential for math success.

Multiplication Facts (Times Tables)

You must memorize these. Practice until you can answer any fact in 3 seconds or less.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Multi-Digit Multiplication

Example: 234 × 6

234

× 6

Step 1: 6 × 4 = 24 → Write 4, carry 2

Step 2: 6 × 3 = 18, plus 2 = 20 → Write 0, carry 2

Step 3: 6 × 2 = 12, plus 2 = 14

Answer: 1,404

Multiplying by Two-Digit Numbers

Example: 45 × 23

45

× 23

----

135 (45 × 3)

900 (45 × 20, shift one place left)

1,035

Multiplication Tricks

• **× 10:** Add a zero (35 × 10 = 350)

• **× 100:** Add two zeros (35 × 100 = 3,500)

• **× 5:** Multiply by 10, then divide by 2 (48 × 5 = 480 ÷ 2 = 240)

• **× 9:** Multiply by 10, then subtract the original (7 × 9 = 70 - 7 = 63)

Practice: Multiplication

1) 67 × 8 =

2) 245 × 6 =

3) 378 × 9 =

4) 56 × 34 =

5) 123 × 45 =

6) 456 × 78 =

7. A bookstore sells 24 boxes of books. Each box has 36 books. How many books total? _____

8. A factory makes 1,250 items per day. How many in 7 days? _____

Section 5: Division

Division splits a number into equal groups. It's the opposite of multiplication.

Division Vocabulary

• **Dividend:** The number being divided (the total)

• **Divisor:** The number you divide by (group size)

• **Quotient:** The answer (number of groups)

• **Remainder:** What's left over

Example: 17 ÷ 5 = 3 R2 (17 is dividend, 5 is divisor, 3 is quotient, 2 is remainder)

Long Division Steps: DMSB

Divide → **M**ultiply → **S**ubtract → **B**ring down → Repeat

Example: 847 ÷ 3

Step 1: 8 ÷ 3 = 2 (write 2 above the 8)

Step 2: 2 × 3 = 6 (write below 8)

Step 3: 8 - 6 = 2

Step 4: Bring down 4 → 24

Step 5: 24 ÷ 3 = 8 (write 8)

Step 6: 8 × 3 = 24, 24 - 24 = 0

Step 7: Bring down 7 → 7

Step 8: 7 ÷ 3 = 2 R1

Answer: 282 R1 (Check: 282 × 3 + 1 = 847 ✓)

Division with Larger Divisors

Example: 1,596 ÷ 12

• 15 ÷ 12 = 1 R3

• Bring down 9 → 39 ÷ 12 = 3 R3

• Bring down 6 → 36 ÷ 12 = 3 R0

Answer: 133

Checking Division

Quotient × Divisor + Remainder = Dividend

Practice: Division

1) 456 ÷ 8 =

2) 729 ÷ 9 =

3) 1,024 ÷ 4 =

4) 2,345 ÷ 5 =

5) 1,872 ÷ 12 =

6) 3,654 ÷ 18 =

7. 1,440 students are divided into 32 classrooms. How many per class? _____

8. 5,000 items are packed into boxes of 25. How many boxes? _____

Section 6: Order of Operations

When a problem has multiple operations, you must solve them in the correct order. Use PEMDAS.

PEMDAS

P - Parentheses first

E - Exponents (powers)

M/D - Multiplication and Division (left to right)

A/S - Addition and Subtraction (left to right)

Memory trick: "Please Excuse My Dear Aunt Sally"

Examples

Example 1: 3 + 4 × 2

Multiply first: 4 × 2 = 8

Then add: 3 + 8 = 11

Example 2: (3 + 4) × 2

Parentheses first: 3 + 4 = 7

Then multiply: 7 × 2 = 14

Example 3: 20 - 12 ÷ 4 + 3

Division first: 12 ÷ 4 = 3

Then left to right: 20 - 3 + 3 = 20

Example 4: 2 × (8 - 3) + 4^2

Parentheses: 8 - 3 = 5

Exponent: 4^2 = 16

Multiply: 2 × 5 = 10

Add: 10 + 16 = 26

Practice: Order of Operations

1) $5 + 3 \times 4 =$ _____

2) $(5 + 3) \times 4 =$ _____

3) $18 \div 6 + 2 \times 5 =$ _____

4) $24 - 8 \div 2 + 6 =$ _____

5) $3 \times (12 - 4) \div 2 =$ _____

6) $(15 + 5) \div (8 - 4) =$ _____

7) $2^3 + 4 \times 3 =$ _____

8) $100 - 5^2 \times 2 =$ _____

Section 7: Factors and Multiples

Factors

Factors are numbers that divide evenly into another number (no remainder).

Example: Factors of 12: 1, 2, 3, 4, 6, 12

(because 12÷1=12, 12÷2=6, 12÷3=4, 12÷4=3, 12÷6=2, 12÷12=1)

Greatest Common Factor (GCF)

The GCF is the largest factor two numbers share.

Example: Find GCF of 18 and 24

Factors of 18: 1, 2, 3, 6, 9, 18

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

Common factors: 1, 2, 3, 6

GCF = 6

Multiples

Multiples are what you get when you multiply a number by 1, 2, 3, 4, etc.

Example: Multiples of 5: 5, 10, 15, 20, 25, 30...

Least Common Multiple (LCM)

The LCM is the smallest multiple two numbers share.

Example: Find LCM of 4 and 6

Multiples of 4: 4, 8, 12, 16, 20, 24...

Multiples of 6: 6, 12, 18, 24, 30...

LCM = 12 (first number in both lists)

Prime and Composite Numbers

• **Prime:** Has exactly 2 factors (1 and itself). Examples: 2, 3, 5, 7, 11, 13

• **Composite:** Has more than 2 factors. Examples: 4, 6, 8, 9, 10, 12

• **Note:** 1 is neither prime nor composite

Practice: Factors and Multiples

1. List all factors of 36: _____

2. Find the GCF of 20 and 30: _____

3. List the first 5 multiples of 7: _____

4. Find the LCM of 8 and 12: _____

5. Is 29 prime or composite? _____

6. Find the GCF of 42 and 56: _____

Section 8: Introduction to Decimals

Decimals are another way to write fractions with denominators of 10, 100, 1000, etc.

Decimal Place Values

Ones	.	Tenths	Hundredths	Thousandths
1	.	0.1	0.01	0.001
		1/10	1/100	1/1000

Example: In 3.456:

• 3 is in the ones place

• 4 is in the tenths place (4/10)

• 5 is in the hundredths place (5/100)

• 6 is in the thousandths place (6/1000)

Reading Decimals

Read the decimal point as 'and', then read the number with its place value.

• 3.4 = 'three and four tenths'

• 5.67 = 'five and sixty-seven hundredths'

• 2.345 = 'two and three hundred forty-five thousandths'

Comparing Decimals

Line up decimal points and compare place by place from left to right.

Example: Compare 0.45 and 0.6

Write with same places: 0.45 vs 0.60

Compare: 4 < 6 in tenths place, so 0.45 < 0.6

Rounding Decimals

Same rules as whole numbers: look at the digit to the right.

Example: Round 3.847 to the nearest tenth

Look at hundredths (4). Since 4 < 5, round down: 3.8

Adding and Subtracting Decimals

Key rule: Line up the decimal points!

3.45

+ 2.30

5.75

Practice: Decimals

1. What is the value of 7 in 4.237? _____

2. Write 0.35 as a fraction: _____

3. Compare: 0.7 ■ 0.65 (write <, >, or =)

4. Round 5.678 to the nearest hundredth: _____

5. 4.56 + 2.3 = _____

6. 8.5 - 3.27 = _____

Section 9: Perimeter and Area

Perimeter

Perimeter is the distance around a shape—the total of all sides.

Rectangle: P = 2 × length + 2 × width, or P = 2(l + w)

Square: P = 4 × side

Triangle: P = side■ + side■ + side■

Example: Find perimeter of a rectangle 8 ft by 5 ft

P = 2(8) + 2(5) = 16 + 10 = 26 feet

Area

Area is the space inside a shape—measured in square units (sq ft, sq m, etc.)

Rectangle: A = length × width

Square: A = side × side = side²

Triangle: A = ½ × base × height

Example: Find area of a rectangle 8 ft by 5 ft

A = 8 × 5 = 40 square feet

Key Formulas

Shape	Perimeter	Area
Rectangle	P = 2l + 2w	A = l × w
Square	P = 4s	A = s²
Triangle	P = a + b + c	A = ½ × b × h

Practice: Perimeter and Area

1. Find the perimeter of a rectangle 12 m by 7 m: _____

2. Find the area of a rectangle 12 m by 7 m: _____

3. Find the perimeter of a square with sides of 9 inches: _____

4. Find the area of a square with sides of 9 inches: _____

5. A triangle has sides of 5 cm, 7 cm, and 10 cm. Find its perimeter: _____

6. A triangle has base 8 ft and height 6 ft. Find its area: _____

7. A rectangular garden is 15 ft by 20 ft. How much fencing is needed? _____

8. How many square feet of grass seed covers that same garden? _____

Section 10: Word Problems

Word problems test whether you understand when to use each operation. Follow these steps:

1. **Read** the problem carefully—twice!

2. **Identify** what you need to find

3. **Decide** which operation(s) to use

4. **Solve** the problem

5. **Check** if your answer makes sense

Operation Clue Words

Addition	Subtraction	Multiplication	Division
sum, total, in all	difference, left	product, times	quotient, each
altogether, combined	remain, fewer	of, per, every	split, shared
increase, more than	decrease, less than	doubled, tripled	average, ratio

Practice: Word Problems

Solve each problem. Show your work.

1. A library has 4,567 books. They receive 1,234 new books and remove 890 damaged ones. How many books do they have now?

_____

2. A store sells 145 items per day for 28 days. How many items were sold in total?

_____

3. 2,400 students are divided equally into 30 classes. How many students are in each class?

_____

4. Maria earns $12 per hour. She works 35 hours per week. How much does she earn in 4 weeks?

_____

5. A rectangular pool is 25 meters long and 10 meters wide. What is its perimeter? What is its area?

_____

6. Tom has $500. He spends $125 on books and $78 on supplies. Then he earns $65 helping a neighbor. How much does he have now?

_____

Answer Key

Section 1: Place Value

1) 9 2) 60,000 3) 8,000 + 0 + 40 + 5 4) < 5) 6,800 6) 35,000

Section 2: Addition

1) 834 2) 1,459 3) 6,912 4) 6,245 5) 21,110 6) 69,134 7) 1,632 8) $4,331

Section 3: Subtraction

1) 377 2) 447 3) 427 4) 2,556 5) 5,433 6) 14,667 7) 653 8) $2,625

Section 4: Multiplication

1) 536 2) 1,470 3) 3,402 4) 1,904 5) 5,535 6) 35,568 7) 864 8) 8,750

Section 5: Division

1) 57 2) 81 3) 256 4) 469 5) 156 6) 203 7) 45 8) 200

Section 6: Order of Operations

1) 17 2) 32 3) 13 4) 26 5) 12 6) 5 7) 20 8) 50

Section 7: Factors and Multiples

1) 1, 2, 3, 4, 6, 9, 12, 18, 36 2) 10 3) 7, 14, 21, 28, 35 4) 24 5) Prime 6) 14

Section 8: Decimals

1) 7 thousandths or 0.007 2) 35/100 or 7/20 3) > 4) 5.68 5) 6.86 6) 5.23

Section 9: Perimeter and Area

1) 38 m 2) 84 sq m 3) 36 inches 4) 81 sq inches 5) 22 cm 6) 24 sq ft 7) 70 ft 8) 300 sq ft

Section 10: Word Problems

1) 4,911 books 2) 4,060 items 3) 80 students 4) $1,680 5) P = 70 m, A = 250 sq m 6) $362

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