THE MENTAL MATHS SPRINT

BOOST SPEED IN JUST 7 DAYS

The Mental Maths Sprint:

Boost Speed in Just 7 Days

A NAPLAN-Focused Mental Maths Programme

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Introduction

Welcome to **The Mental Maths Sprint**, your 7-day programme designed specifically to boost your calculation speed for NAPLAN success. Mental maths skills are essential for the NAPLAN numeracy test, where time is limited and calculator use is restricted in certain sections.

The ability to perform quick mental calculations gives students a significant advantage in several ways:

- **Time efficiency:** Save precious minutes during the non-calculator sections of NAPLAN
- **Reduced errors:** Mental calculation can often be more accurate than rushed written work
- **Increased confidence:** Strong mental maths skills build mathematical confidence
- **Improved number sense:** Regular practice enhances overall numerical fluency

The NAPLAN numeracy assessment includes questions that test various mathematical skills, but the ability to calculate quickly and accurately underpins success across all areas. This ebook focuses on developing rapid mental calculation techniques that will help you tackle NAPLAN questions more efficiently.

How to Use This Book

Follow the 7-day programme in sequence, spending approximately 30 minutes each day on the exercises. Each day builds upon the previous day's skills, gradually increasing in complexity. The book is suitable for students in Years 3, 5, 7, and 9, with exercises marked according to year level appropriateness.

By the end of this 7-day sprint, you'll have a comprehensive toolkit of mental calculation strategies that will significantly boost your speed and confidence in the NAPLAN numeracy test.

Ready to begin your mental maths sprint? Let's get started with Day 1!

Day 1: Number Bonds and Partitioning

Core Skills Focus:

Understanding number bonds to 10 and 100, and how to partition numbers for easier mental calculations.

Warm-Up Exercises

Quick Bonds to 10 Year 3 Year 5

Say these number bonds to 10 as quickly as you can:

1 + ? = 10	7 + ? = 10	3 + ? = 10	8 + ? = 10	5 + ? = 10

Bonds to 100 Year 5 Year 7

Complete these number bonds to 100:

35 + ? = 100	68 + ? = 100	47 + ? = 100	82 + ? = 100	25 + ? = 100

Strategy Explanation

Number Bonds

Number bonds are pairs of numbers that add up to a target number. Knowing these pairs instantly is fundamental to quick mental calculation.

Why Number Bonds Matter:

When you automatically know that 7 and 3 make 10, calculations like 27 + 13 become simpler. You can quickly identify that 7 + 3 = 10, and 20 + 10 = 30, so 27 + 13 = 40.

Partitioning

Partitioning means breaking numbers into parts (usually by place value) to make calculations easier.

Example:

To calculate 36 + 45:

1. Partition: 36 = 30 + 6 and 45 = 40 + 5
2. Add tens: 30 + 40 = 70
3. Add ones: 6 + 5 = 11
4. Combine: 70 + 11 = 81

Practice Problems

Use Partitioning to Solve:

Year 3 Problems:

24 + 35 = ?	46 + 32 = ?	51 + 27 = ?

Year 5 Problems:

67 + 58 = ?	125 + 247 = ?	324 + 178 = ?

Year 7/9 Problems:

346 + 598 = ?	1.25 + 3.8 = ?	5.6 + 2.75 = ?

Speed Challenge

60-Second Sprint: Number Bonds

How many of these can you complete within 60 seconds? Track your time and see if you can beat it later!

6 + ? = 10	? + 4 = 20	25 + ? = 100	? + 65 = 100
7 + ? = 50	? + 28 = 50	45 + ? = 100	? + 37 = 100

Cool-Down Activities

Real-Life Application

Throughout the day, look for opportunities to use your number bond knowledge:

- When shopping, round prices to the nearest whole number and calculate the approximate total
- Calculate the total cost of items and how much change you'd receive from $10 or $100
- Notice numbers around you (on signs, clocks, etc.) and think about what you'd add to make 10, 50, or 100

Day 1 Key Takeaway:

Knowing your number bonds and using partitioning makes more complex addition much faster. Practice these fundamental skills daily for maximum benefit.

Day 2: Addition Strategies

Core Skills Focus:

Advanced addition strategies including compensation, working with near multiples, and bridging through 10 and 100.

Warm-Up Exercises

Quick Fire Addition Year 3 Year 5

Calculate these as quickly as possible:

9 + 7	8 + 6	7 + 8	9 + 8	6 + 9

Near Multiples Year 5 Year 7

Work out these additions using rounding and compensation:

99 + 37	198 + 43	49 + 38	597 + 86	1999 + 267

Strategy Explanation

Compensation Strategy

This strategy involves adjusting one number to make it easier to work with, then compensating at the end.

Example:

To calculate 97 + 56:

1. Adjust 97 to 100 (adding 3)
2. Calculate 100 + 56 = 156
3. Compensate by subtracting 3: 156 - 3 = 153

Bridging Through 10 or 100

This strategy involves first adding enough to reach the next multiple of 10 or 100, then adding the rest.

Example:

To calculate 57 + 36:

1. Bridge 57 to 60 by adding 3 (from the 36)
2. That leaves 33 remaining from the 36
3. Add 60 + 33 = 93

Working with Near Multiples

For numbers ending in 9, 99, or similar patterns, treat them as the next round number and adjust afterwards.

Example:

To calculate 199 + 46:

1. Treat 199 as 200
2. Calculate 200 + 46 = 246
3. Adjust by subtracting 1: 246 - 1 = 245

Practice Problems

Apply the Compensation Strategy:

Year 3 Problems:

19 + 23 = ?	29 + 14 = ?	39 + 27 = ?

Year 5 Problems:

98 + 35 = ?	79 + 46 = ?	199 + 57 = ?

Year 7/9 Problems:

997 + 268 = ?	3.99 + 2.45 = ?	599 + 437 = ?

Speed Challenge

90-Second Sprint: Mixed Addition Strategies

Complete these additions using the most efficient mental strategy for each one. Try to finish within 90 seconds!

28 + 35 = ?	99 + 76 = ?
47 + 99 = ?	58 + 67 = ?
199 + 123 = ?	75 + 48 = ?
295 + 108 = ?	1999 + 365 = ?

Cool-Down Activities

Strategy Selection

For each question, identify which strategy you would use and why:

Calculation	Best Strategy	Why?
56 + 38		
97 + 25		
499 + 75		

Complete this table in your notebook, explaining your choice of strategy for each calculation.

Day 2 Key Takeaway:

Being flexible with your addition strategies and choosing the most efficient approach for each calculation will significantly improve your speed. Focus on recognizing patterns that suggest a particular strategy.

Day 3: Subtraction Strategies

Core Skills Focus:

Efficient mental subtraction using counting up, compensation, and equal addition techniques.

Warm-Up Exercises

Number Bonds in Reverse Year 3 Year 5

Complete these subtractions quickly:

10 - 3 = ?	10 - 7 = ?	20 - 8 = ?	20 - 12 = ?	100 - 35 = ?

Subtracting from Multiples Year 5 Year 7

Calculate quickly:

100 - 27	200 - 45	500 - 78	1000 - 364	300 - 125

Strategy Explanation

Counting Up Strategy (Complementary Addition)

Instead of taking away, find the difference by counting up from the smaller number to the larger number. This is especially useful when numbers are close together.

Example:

To calculate 83 - 79:

1. Count up from 79 to 80 (+1)
2. Count up from 80 to 83 (+3)
3. Total counted up: 1 + 3 = 4
4. Therefore, 83 - 79 = 4

Compensation Strategy for Subtraction

Adjust one or both numbers to make the calculation easier, then compensate at the end.

Example:

To calculate 203 - 98:

1. Adjust 98 to 100 (adding 2)
2. Calculate 203 - 100 = 103
3. Compensate by adding 2: 103 + 2 = 105 (since we made the subtraction amount bigger)

Equal Addition Strategy

Add the same amount to both numbers to make the subtraction easier. This works because the difference stays the same.

Example:

To calculate 324 - 178:

1. Add 2 to both numbers: (324 + 2) - (178 + 2)
2. This gives 326 - 180
3. Calculate 326 - 180 = 146

Practice Problems

Apply the Counting Up Strategy:

Year 3 Problems:

42 - 38 = ?	26 - 19 = ?	51 - 47 = ?

Year 5 Problems:

103 - 97 = ?	252 - 246 = ?	401 - 395 = ?

Apply the Compensation Strategy:

Year 5 Problems:

81 - 29 = ?	123 - 98 = ?	264 - 99 = ?

Year 7/9 Problems:

503 - 298 = ?	7.5 - 2.95 = ?	1005 - 998 = ?

Speed Challenge

90-Second Subtraction Sprint

Use the most appropriate strategy for each subtraction. How many can you complete in 90 seconds?

62 - 37 = ?	100 - 68 = ?

143 - 99 = ?	52 - 47 = ?
300 - 175 = ?	82 - 19 = ?
204 - 97 = ?	501 - 498 = ?

Cool-Down Activities

Strategy Selection for Subtraction

For each calculation, decide which strategy would be most efficient and explain why:

1. 72 - 68 (Counting up, because...)
2. 156 - 99 (Compensation, because...)
3. 324 - 147 (Equal addition, because...)
4. 1000 - 375 (Direct subtraction, because...)

Complete this activity in your notebook with full explanations.

Day 3 Key Takeaway:

For subtraction, choosing the right strategy is crucial. Use counting up when numbers are close together, compensation when dealing with 9s or 99s, and equal addition to make awkward subtractions more manageable.

Day 4: Multiplication Shortcuts

Core Skills Focus:

Rapid multiplication using doubling and halving, multiplying by 9/11/25, and using known facts.

Warm-Up Exercises

Times Tables Recall Year 3 Year 5

Answer these multiplication facts as quickly as possible:

7 × 8	6 × 9	4 × 12	8 × 7	9 × 7

Doubling Practice Year 5 Year 7

Double these numbers:

35	45	75	125	250

Strategy Explanation

Doubling and Halving

Double one factor and halve the other to create an equivalent but easier calculation.

Example:

To calculate 25 × 16:

1. Double 25 → 50, and halve 16 → 8
2. Calculate 50 × 8 = 400

Multiplying by 9

Multiply by 10 and subtract the original number.

Example:

To calculate 9 × 27:

1. 10 × 27 = 270
2. 270 - 27 = 243

Multiplying by 11

For single-digit numbers: duplicate the digit for the answer (e.g., 11 × 6 = 66).

For two-digit numbers: add the digits and place between the original digits (with carrying if needed).

Example:

To calculate 11 × 43:

1. First and last digits stay the same: 4__3
2. Add the digits: 4 + 3 = 7
3. Place between: 473

Multiplying by 25

Multiply by 100 and divide by 4 (since 25 = 100 ÷ 4).

Example:

To calculate 25 × 36:

1. 36 × 100 = 3600
2. 3600 ÷ 4 = 900

Practice Problems

Apply Doubling and Halving:

Year 5 Problems:

18 × 5 = ?	14 × 50 = ?	24 × 15 = ?

Year 7/9 Problems:

35 × 16 = ?	75 × 12 = ?	125 × 24 = ?

Apply Special Multiplication Strategies:

Year 3/5 Problems:

9 × 8 = ?	11 × 9 = ?	25 × 4 = ?

Year 7/9 Problems:

9 × 87 = ?	11 × 45 = ?	25 × 64 = ?

Speed Challenge

Multiplication Sprint

Use the most efficient strategy for each calculation. Time yourself!

9 × 35 = ?	25 × 12 = ?
11 × 54 = ?	18 × 25 = ?
16 × 35 = ?	99 × 6 = ?
25 × 48 = ?	11 × 36 = ?

Cool-Down Activities

Create Your Own Shortcuts

Develop your own multiplication shortcuts for the following numbers:

- Multiplying by 5 (hint: halve and multiply by 10)
- Multiplying by 15 (hint: combine ×10 and ×5)
- Multiplying by 20 (hint: double and multiply by 10)

Write down the step-by-step process for each shortcut and test it on a few examples.

Day 4 Key Takeaway:

Multiplication shortcuts save significant time in the NAPLAN numeracy test. Master these techniques by practicing them regularly until they become automatic.

Day 5: Division Techniques

Core Skills Focus:

Mental division strategies including halving, using known multiplication facts, and dividing by special numbers.

Warm-Up Exercises

Division Facts Recall Year 3 Year 5

Calculate these divisions quickly:

56 ÷ 7	63 ÷ 9	48 ÷ 6	72 ÷ 8	81 ÷ 9

Halving Practice Year 5 Year 7

Halve these numbers:

86	124	250	360	480

Strategy Explanation

Division Using Known Multiplication Facts

Reframe division problems as missing factor multiplication problems.

Example:

To calculate 72 ÷ 9:

1. Think: "9 × what = 72?"
2. The answer is 8, since 9 × 8 = 72

Dividing by 5

Multiply by 2, then divide by 10 (since 5 = 10 ÷ 2).

Example:

To calculate 85 ÷ 5:

1. Double 85: 85 × 2 = 170
2. Divide by 10: 170 ÷ 10 = 17

Dividing by 25

Multiply by 4, then divide by 100 (since 25 = 100 ÷ 4).

Example:

To calculate 175 ÷ 25:

1. Multiply by 4: 175 × 4 = 700
2. Divide by 100: 700 ÷ 100 = 7

Halving and Halving Again

For division by 4, halve the number twice.

Example:

To calculate 124 ÷ 4:

1. Half of 124 = 62
2. Half of 62 = 31

Practice Problems

Apply Division Strategies:

Year 3/5 Problems:

65 ÷ 5 = ?	120 ÷ 4 = ?	200 ÷ 25 = ?

Year 7 Problems:

455 ÷ 5 = ?	416 ÷ 8 = ?	450 ÷ 25 = ?

Year 9 Problems:

1250 ÷ 25 = ?	848 ÷ 8 = ?	7.5 ÷ 5 = ?

Speed Challenge

Division Sprint

Use mental division strategies to solve these problems as quickly as possible:

84 ÷ 4 = ?	125 ÷ 25 = ?
245 ÷ 5 = ?	96 ÷ 8 = ?
550 ÷ 25 = ?	320 ÷ 4 = ?
450 ÷ 9 = ?	360 ÷ 20 = ?

Cool-Down Activities

Division and Multiplication Relationship

For each division problem, write the related multiplication fact:

Division	Multiplication
144 ÷ 12 = 12	12 × 12 = 144
225 ÷ 25 = 9	
420 ÷ 6 = 70	
810 ÷ 9 = 90	

Complete this table to strengthen the connection between multiplication and division in your mind.

Day 5 Key Takeaway:

Division becomes much easier when you leverage the relationship with multiplication. The strategies for dividing by 5, 25, and powers of 2 are particularly valuable for NAPLAN questions.

Day 6: Percentages, Fractions, and Decimals

Core Skills Focus:

Quick conversions between percentages, fractions, and decimals, and mental calculation of common percentages.

Warm-Up Exercises

Common Conversions Year 5 Year 7

Convert between these forms:

50% = ?	¼ = ?%	0.75 = ?%
⅕ = ?	0.2 = ?	60% = ?

Finding Percentages Year 7 Year 9

Calculate mentally:

10% of 240	25% of 80	50% of 126
20% of 85	75% of 120	5% of 60

Strategy Explanation

Key Percentage-Fraction-Decimal Equivalents

Memorise these common conversions:

Percentage	Fraction	Decimal
10%	1/10	0.1
20%	1/5	0.2
25%	1/4	0.25
33⅓%	1/3	0.333...
50%	1/2	0.5

75%	3/4	0.75
66⅔%	2/3	0.666...

Calculating Percentages Mentally

Use these strategies to find percentages quickly:

10% Strategy:

To find 10%, divide by 10.

Example: 10% of 350 = 350 ÷ 10 = 35

Building from 10%:

Use 10% as a building block for other percentages:

- 20% = double 10%
- 5% = half of 10%
- 15% = 10% + 5%

Example: 15% of 80 = 10% of 80 + 5% of 80 = 8 + 4 = 12

25% and 75%:

25% = divide by 4, and 75% = 100% - 25%

Example: 25% of 120 = 120 ÷ 4 = 30, and 75% of 120 = 120 - 30 = 90

Practice Problems

Calculate Percentages Mentally:

Year 5 Problems:

10% of 90 = ?	50% of 38 = ?	25% of 24 = ?

Year 7 Problems:

15% of 80 = ?	75% of 120 = ?	5% of 220 = ?

Year 9 Problems:

35% of 160 = ?	12.5% of 240 = ?	62.5% of 80 = ?

Speed Challenge

Conversions and Percentages Sprint

Complete these calculations as quickly as possible:

0.35 = ?%	⅜ = ?%
20% of 155 = ?	30% of 80 = ?
⅔ as a decimal = ?	40% of 75 = ?
0.45 = ?%	25% of 184 = ?

Cool-Down Activities

Real-World Percentage Applications

Solve these real-life percentage problems:

1. A shirt usually costs $80 but is on sale with 25% off. What is the sale price?
2. In a class of 30 students, 40% are boys. How many boys are in the class?
3. A car was priced at $15,000 and increased in value by 5%. What is the new value?
4. Jade scored 36 out of 40 on her test. What percentage did she score?

Day 6 Key Takeaway:

Percentage problems are common in NAPLAN. By memorising key conversions and using the 10% building block method, you can solve these problems quickly and accurately.

Day 7: Mixed Problems and Speed Drills

Core Skills Focus:

Integrating all strategies learned in Days 1-6, with an emphasis on quick strategy selection and building calculation speed.

Warm-Up Exercises

Strategy Recall Year 3 Year 5 Year 7 Year 9

For each calculation, identify the most efficient mental strategy:

97 + 58 = ? (Strategy: _____)

125 × 24 = ? (Strategy: _____)

83 - 79 = ? (Strategy: _____)

375 ÷ 25 = ? (Strategy: _____)

Mixed Practice Problems

Year 3 Mixed Problems

Problem 1:
A box contains 24 coloured pencils. 7 are blue and 5 are red. How many pencils are not blue or red?

Problem 2:
Sam has 45 marbles. She gives 19 to her friend. How many marbles does she have left?

Problem 3:
A fruit shop has 6 baskets. Each basket holds 8 apples. How many apples are there altogether?

Problem 4:
28 children are going to the zoo. They travel in vans that each hold 4 children. How many vans are needed?

Year 5 Mixed Problems

Problem 1:
A book costs $24. It is reduced by 25% in a sale. What is the sale price?

Problem 2:
Anna buys 3 notebooks for $4.50 each and a pen for $2.75. How much does she spend altogether?

Problem 3:
A rectangular garden is 9 metres long and 7 metres wide. What is its area?

Problem 4:
A train leaves at 10:35 am and arrives at 1:20 pm. How long is the journey?

Year 7/9 Mixed Problems

Problem 1:
A rectangle has a perimeter of 74 cm. Its length is 25 cm. What is its width?

Problem 2:
A shirt originally priced at $75 is discounted by 15%. What is the discount amount?

Problem 3:
The ratio of boys to girls in a class is 3:5. If there are 24 boys, how many students are in the class?

Problem 4:
The average of five numbers is 28. If four of the numbers are 25, 30, 22, and 31, what is the fifth number?

Speed Challenge

NAPLAN-Style Speed Trial

Answer these questions as quickly as possible, choosing the most efficient mental strategy for each one. Aim to complete all 10 questions in 5 minutes or less.

Question 1:
Calculate 199 + 156

Question 2:
Find 15% of 80

Question 3:
Calculate 11 × 35

Question 4:
Find the value of ⅖ of 125

Question 5:
Calculate 302 - 98

Question 6:
Express 0.625 as a percentage

Question 7:
Calculate 24 × 25

Question 8:
Find 450 ÷ 9

Question 9:
If a shirt costs $56 and is reduced by 25%, what is the sale price?

Question 10:
A rectangle has an area of 143 cm². If its length is 11 cm, what is its width?

Strategy Selection Guide

Quick Reference Guide for Strategy Selection

Use this reference guide to help you select the most efficient strategy for different types of calculations:

Number Pattern	Recommended Strategy
Numbers ending in 9, 99, etc.	Compensation (round up and adjust)
Numbers close together (subtraction)	Counting up
Multiplying by 5, 25, 50	Relate to multiplying by 10 or 100
Multiplying by 9 or 11	Special patterns or relate to 10
Division by 5 or 25	Multiply and divide by powers of 10
Finding percentages	Use 10% as a building block

Day 7 Key Takeaway:

The key to NAPLAN numeracy success is quickly recognizing which strategy to apply to different question types. Continue practicing these techniques regularly until they become second nature.

NAPLAN-Specific Tips

Timing Strategies

- **First pass:** Answer all questions you can solve quickly, marking difficult ones to return to later
- **Time allocation:** Spend no more than 1-2 minutes per question in the non-calculator section
- **Final minutes:** Make educated guesses for any remaining questions—never leave questions unanswered

Question Interpretation

- **Read carefully:** Look for key words that indicate which operation to use
- **Diagrams and charts:** Always check units of measurement and scales
- **Multiple-choice strategy:** Estimate the answer first, then look for the closest option

Common NAPLAN Numeracy Question Types

- **Number patterns:** Look for the rule by finding the difference/ratio between consecutive terms
- **Word problems:** Identify the key information and eliminate distractions
- **Multi-step problems:** Work backwards from what you need to find
- **Measurement problems:** Pay attention to units and conversion factors

Checking Your Work

If time permits, use these methods to verify your answers:

- **Estimation:** Round numbers to check if your answer is reasonable
- **Inverse operations:** Use addition to check subtraction, and multiplication to check division
- **Substitution:** For algebra problems, substitute your answer back into the original equation

Year-Specific NAPLAN Focus Areas

Year 3:

- Basic operations with numbers up to 1000

- Simple fractions (½, ¼, ⅓)
- Simple patterns and relationships

Year 5:

- Operations with larger numbers and decimals
- Equivalent fractions and percentages
- Properties of 2D and 3D shapes

Year 7:

- Ratios and rates
- Algebraic expressions
- Area and volume calculations

Year 9:

- Problem-solving with linear functions
- Pythagoras' theorem and trigonometry
- Statistical analysis and probability

Progress Tracking Tools

Use these tools to track your improvement in mental maths speed throughout the 7-day programme.

Daily Speed Log

Day	10 Questions Time (sec)	Accuracy (out of 10)	Notes
Day 1 (Baseline)			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			

Day 7 (Final)			

Strategy Mastery Checklist

Rate your confidence with each strategy from 1 (need more practice) to 5 (mastered):

Strategy	Starting Rating	Ending Rating
Number Bonds and Partitioning		
Compensation (Addition)		
Bridging Through 10/100		
Counting Up (Subtraction)		
Compensation (Subtraction)		
Doubling and Halving		
Multiplying by 9/11/25		
Division Strategies		
Percentage Calculations		
Strategy Selection		

Areas for Further Practice

Note down any specific strategies or problem types you need to focus on:

e.g., Need more practice with subtraction using compensation

Conclusion and Test Day Advice

Your Mental Maths Toolkit

Over the past 7 days, you've developed a powerful toolkit of mental calculation strategies:

- Number bonds and partitioning for addition
- Compensation and counting up for subtraction
- Doubling, halving, and special number shortcuts for multiplication
- Efficient division techniques
- Quick percentage calculations
- Strategy selection skills for mixed problems

Continue practicing these strategies regularly to maintain and further develop your mental calculation speed.

Test Day Preparation

The Night Before

- Get a good night's sleep (8+ hours)
- Pack everything you need for the test (pencils, eraser, calculator if allowed)
- Review your strategy selection guide but avoid intense studying

The Morning of the Test

- Eat a nutritious breakfast
- Arrive at school with plenty of time to spare
- Do a few simple mental calculations to warm up your brain
- Take deep breaths to stay calm and focused

During the Test

- Read each question carefully, identifying what you need to find
- Use the mental maths strategies that work best for you
- Track your time and move on if you get stuck

- Double-check your work if time permits
- Stay positive—remember all the strategies you've mastered!

Beyond NAPLAN

The mental maths skills you've developed through this programme will benefit you far beyond the NAPLAN test. These strategies will help you:

- Save time on future maths tests and exams
- Build confidence in your mathematical abilities
- Apply mathematical thinking to everyday situations
- Develop a stronger foundation for advanced mathematics

Continue practicing these strategies regularly, and they'll become second nature!

Final Thoughts

Remember that NAPLAN is just one assessment on your educational journey. The mental maths skills you've developed are valuable tools that will serve you well throughout your life. Approach the test with confidence, knowing you've prepared thoroughly.

Best of luck on your NAPLAN test!