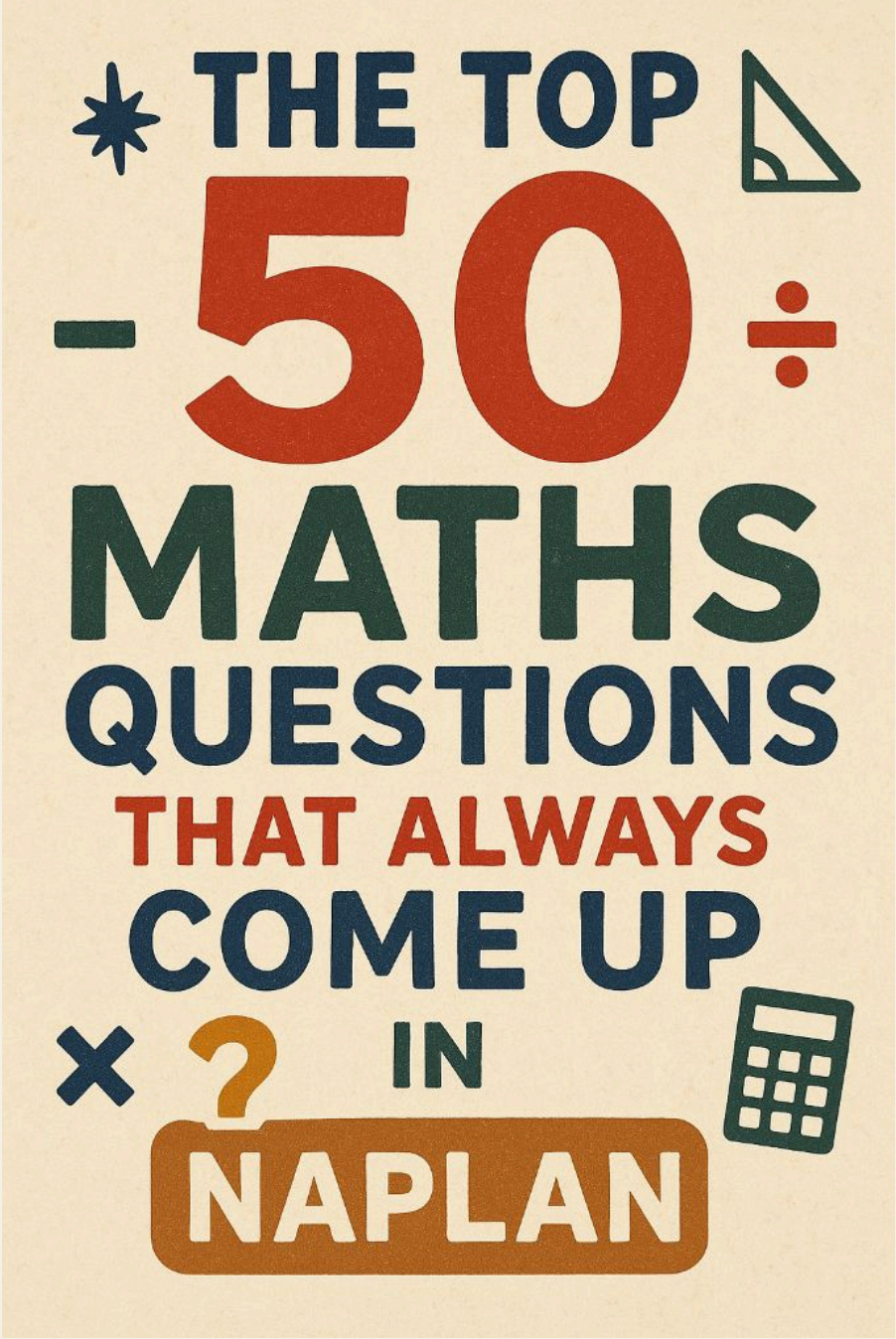


The Top 50 Maths Questions That Always Come Up in NAPLAN

A comprehensive guide to mastering NAPLAN numeracy

Table of Contents

Introduction

The National Assessment Program – Literacy and Numeracy (NAPLAN) is a nationwide standardised assessment for students in Years 3, 5, 7, and 9 in Australia. The numeracy component assesses students' mathematical knowledge, understanding, skills, and problem-solving abilities across three main content strands: Number and Algebra, Measurement and Geometry, and Statistics and Probability.

This ebook presents 50 of the most common types of mathematics questions that frequently appear in NAPLAN assessments. Each question is accompanied by a detailed, step-by-step solution and helpful tips for approaching similar problems. The questions are organised by content strand and difficulty level to help students build their skills progressively.

NAPLAN numeracy tests assess students' abilities to:

- Apply mathematical knowledge to solve problems
- Interpret and analyse information
- Make connections between different mathematical concepts
- Use mathematical reasoning to explain solutions

- Communicate mathematical ideas effectively

Students in Years 7 and 9 complete two numeracy tests: one where calculator use is permitted and one where it is not. Students in Years 3 and 5 complete a single numeracy test where calculators are not permitted. This ebook includes questions relevant to both calculator and non-calculator sections.

By working through these 50 questions, students will develop familiarity with the types of questions they can expect to encounter in NAPLAN, improve their problem-solving strategies, and build confidence in their mathematical abilities.

Number and Algebra (Questions 1-20)

Year 3-4 Level (Questions 1-7)

Question 1: Place Value

What is the value of the underlined digit in the number 5<u>3</u>842?

A. 3
B. 30
C. 300
D. 3,000

Solution:

In the number 53842, the digit 3 is in the thousands place.
Therefore, the value of the digit 3 in this number is 3 × 1,000 = 3,000.
Answer: D. 3,000

> **Tip:**
>
> Remember the place value system: units, tens, hundreds, thousands, ten thousands, etc. The value of a digit depends on its position in the number. When asked about the value of a digit, multiply the digit by its place value.

Question 2: Addition and Subtraction

Sarah had 235 stickers. She gave 48 stickers to her friend and then bought 27 more stickers. How many stickers does Sarah have now?

Solution:

Step 1: First, we need to subtract the stickers Sarah gave away.
235 - 48 = 187
Step 2: Then, we add the new stickers Sarah bought.
187 + 27 = 214
Answer: 214 stickers

Tip:

For multi-step word problems, identify what operations you need to perform (addition, subtraction, multiplication, or division) and in what order. Writing out the steps can help you keep track of the calculation process.

Question 3: Multiplication Facts

Complete the following multiplication fact: 7 × 8 = ?

A. 54
B. 56
C. 63
D. 65

Solution:

To solve this, we multiply 7 by 8:
7 × 8 = 56
Answer: B. 56

Tip:

Memorising multiplication facts up to 12 × 12 will save you valuable time during the test. If you don't remember a specific fact, you can break it down. For example, 7 × 8 could be calculated as 7 × 4 × 2 = 28 × 2 = 56.

Question 4: Number Patterns

What numbers come next in this pattern?

3, 7, 11, 15, __, __

Solution:

Let's look at the differences between consecutive numbers:
7 - 3 = 4
11 - 7 = 4
15 - 11 = 4
We can see that each number increases by 4. So, the next two numbers will be:
15 + 4 = 19
19 + 4 = 23
Answer: 19, 23

Tip:

When identifying number patterns, look for the relationship between consecutive numbers. Calculate the difference between each pair of numbers to see if there's a constant increase or decrease. For more complex patterns, check if the differences follow a pattern themselves.

Question 5: Division

24 chocolate bars are shared equally among 6 children. How many chocolate bars does each child receive?

Solution:

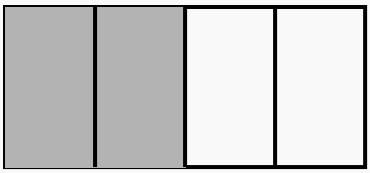
To find how many chocolate bars each child receives, we divide the total number of chocolate bars by the number of children:
24 ÷ 6 = 4
Answer: 4 chocolate bars per child

Tip:

When items are shared equally among a group, division is used. Remember that division can be thought of as: "How many groups of [divisor] are in [dividend]?" or "If [dividend] is divided into [divisor] equal groups, how many are in each group?"

Question 6: Simple Fractions

What fraction of the shape is shaded?



A. 1/2
B. 2/4
C. 2/3
D. 3/4

Solution:

The rectangle is divided into 4 equal parts, and 2 of those parts are shaded.
Therefore, the fraction of the shape that is shaded is 2/4.
We can simplify this fraction: 2/4 = 1/2
Answer: A. 1/2 or B. 2/4 (both are correct, but A is the simplified form)

Tip:

When determining what fraction is shaded, count the total number of equal parts (denominator) and the number of shaded parts (numerator). Remember to express your answer in the simplest form by finding the greatest common divisor (GCD) of the numerator and denominator and dividing both by it.

Question 7: Money

Tom buys a pencil for 85 cents and a notebook for $2.50. How much change will he receive from a $5 note?

Solution:

Step 1: Convert all amounts to the same unit (dollars or cents).
85 cents = $0.85
Step 2: Find the total cost of the items.
$0.85 + $2.50 = $3.35
Step 3: Calculate the change.
$5.00 - $3.35 = $1.65
Answer: $1.65

Tip:

When working with money, ensure all values are in the same units before performing calculations. For finding change, subtract the total cost from the amount given.

Double-check your calculations by adding the cost and change to ensure they equal the original amount.

Year 5-6 Level (Questions 8-14)

Question 8: Decimals

Which decimal is equivalent to 3/4?

A. 0.25
B. 0.34
C. 0.75
D. 0.80

Solution:

To convert a fraction to a decimal, divide the numerator by the denominator:
3 ÷ 4 = 0.75
Answer: C. 0.75

Tip:

To convert a fraction to a decimal, divide the numerator by the denominator. Memorising common fraction-decimal equivalents (1/4 = 0.25, 1/2 = 0.5, 3/4 = 0.75) can save time during the test.

Question 9: Percentages

What is 25% of 80?

Solution:

To find a percentage of a number, convert the percentage to a decimal and multiply:
25% = 25/100 = 0.25
0.25 × 80 = 20
Answer: 20

Tip:

When finding percentages, you can use these methods:

1. Convert the percentage to a decimal (divide by 100) and multiply by the number.
2. For common percentages, use shortcuts: 25% is 1/4, 50% is 1/2, 75% is 3/4.

3. For 10%, divide by 10; for 5%, divide by 20; for 1%, divide by 100.

Question 10: Order of Operations

Calculate the value of: 24 ÷ 8 + 3 × 2

A. 6
B. 9
C. 12
D. 18

Solution:

Using the order of operations (BODMAS/BIDMAS):
Step 1: Division and multiplication (from left to right)
24 ÷ 8 = 3
3 × 2 = 6
Step 2: Addition
3 + 6 = 9
Answer: B. 9

Tip:

Remember the order of operations with the acronym BODMAS or BIDMAS:
B: Brackets
O/I: Orders/Indices (powers, square roots)
D/M: Division and Multiplication (from left to right)
A/S: Addition and Subtraction (from left to right)
Perform calculations in this order to get the correct answer.

Question 11: Equivalent Fractions

Which fraction is equivalent to 2/3?

A. 4/5
B. 4/6
C. 6/9
D. 3/5

Solution:

To find an equivalent fraction, multiply or divide both the numerator and denominator by the same number.
For 2/3, if we multiply both by 2: (2 × 2)/(3 × 2) = 4/6
If we multiply both by 3: (2 × 3)/(3 × 3) = 6/9
Both 4/6 and 6/9 are equivalent to 2/3. From the given options, B. 4/6 and C. 6/9 are correct.
Answer: B. 4/6 and C. 6/9

Tip:

To check if fractions are equivalent, you can:

1. Cross-multiply: For fractions a/b and c/d, check if a × d = b × c.
2. Convert to decimals: Equivalent fractions have the same decimal value.
3. Simplify both fractions to their lowest terms.

Question 12: Word Problem with Multiple Operations

A bakery makes 156 muffins. They pack 6 muffins in each box and sell each box for $8.50. How much money will they make if they sell all the muffins?

Solution:

Step 1: Find how many boxes they can fill with the muffins.
Number of boxes = Total muffins ÷ Muffins per box
Number of boxes = 156 ÷ 6 = 26 boxes
Step 2: Calculate the total money made from selling all boxes.
Total money = Number of boxes × Price per box
Total money = 26 × $8.50 = $221
Answer: $221

Tip:

For multi-step word problems:

1. Identify the quantities given and what you need to find.
2. Break the problem into smaller steps.
3. Calculate each step sequentially.
4. Check if your answer makes sense in the context of the problem.

Question 13: Comparing and Ordering Fractions

Arrange these fractions in ascending order: 2/5, 1/2, 3/10

Solution:

To compare fractions with different denominators, we can convert them to equivalent fractions with a common denominator or convert them to decimals.
Converting to decimals:
2/5 = 0.4
1/2 = 0.5
3/10 = 0.3
Arranging in ascending order: 3/10, 2/5, 1/2
Answer: 3/10, 2/5, 1/2

Tip:

When comparing fractions with different denominators, you can:

1. Convert all fractions to equivalent fractions with the same denominator (find the LCM of the denominators).
2. Convert all fractions to decimals.
3. Use benchmark fractions (like 0, 1/2, and 1) to help with comparisons.

Question 14: Number Properties

Which of these numbers is divisible by both 3 and 4?

A. 18
B. 24
C. 30
D. 35

Solution:

A number is divisible by 3 if the sum of its digits is divisible by 3.
A number is divisible by 4 if its last two digits form a number that is divisible by 4.
Let's check each option:
A. 18: Sum of digits = 1 + 8 = 9 (divisible by 3), 18 is not divisible by 4 (18 ÷ 4 = 4 remainder 2).
B. 24: Sum of digits = 2 + 4 = 6 (divisible by 3), and 24 is divisible by 4 (24 ÷ 4 = 6).
C. 30: Sum of digits = 3 + 0 = 3 (divisible by 3), 30 is not divisible by 4 (30 ÷ 4 = 7 remainder 2).
D. 35: Sum of digits = 3 + 5 = 8 (not divisible by 3), 35 is not divisible by 4 (35 ÷ 4 = 8 remainder 3).

Answer: B. 24

Tip:

Divisibility rules can help you quickly determine if a number is divisible by another without performing division:

- Divisible by 2: Last digit is 0, 2, 4, 6, or 8.
- Divisible by 3: Sum of digits is divisible by 3.
- Divisible by 4: Last two digits form a number divisible by 4.
- Divisible by 5: Last digit is 0 or 5.
- Divisible by 6: Divisible by both 2 and 3.
- Divisible by 9: Sum of digits is divisible by 9.
- Divisible by 10: Last digit is 0.

Year 7-9 Level (Questions 15-20)

Question 15: Algebraic Expressions

If $x = 3$ and $y = -2$, what is the value of $2x^2 - 3y$?

Solution:

Substitute the values of x and y into the expression $2x^2 - 3y$:

$2x^2 - 3y = 2(3)^2 - 3(-2)$

$= 2 \times 9 - 3 \times (-2)$

$= 18 - (-6)$

$= 18 + 6$

$= 24$

Answer: 24

Tip:

When evaluating algebraic expressions:

1. Substitute the given values for each variable.
2. Follow the order of operations (BODMAS/BIDMAS).
3. Be careful with negative numbers, especially when squaring them or multiplying them.

Question 16: Ratio and Proportion

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

Solution:

Step 1: Find the total parts in the ratio.
Total parts = 3 + 5 = 8 parts
Step 2: Find the value of each part.
Value of each part = Total students ÷ Total parts = 24 ÷ 8 = 3
Step 3: Calculate the number of boys.
Number of boys = Boys parts × Value of each part = 3 × 3 = 9
Answer: 9 boys

Tip:

When solving ratio problems:

1. Find the total parts in the ratio by adding all the values.
2. Divide the total quantity by the total parts to find the value of one part.
3. Multiply the number of parts for each category by the value of one part.

Question 17: Linear Equations

Solve for x: 3x - 7 = 5

Solution:

Step 1: Add 7 to both sides of the equation to isolate the term with x.
3x - 7 + 7 = 5 + 7
3x = 12
Step 2: Divide both sides by 3 to find the value of x.
3x ÷ 3 = 12 ÷ 3
x = 4
Answer: x = 4

Tip:

When solving linear equations:

1. Perform the same operation on both sides of the equation to maintain balance.
2. First, isolate the variable term (move all other terms to the other side).
3. Then, isolate the variable itself (divide or multiply as needed).

4. Check your answer by substituting it back into the original equation.

Question 18: Indices/Exponents

Calculate the value of $2^3 \times 2^2$

A. 32
B. 64
C. 25
D. 32

Solution:

When multiplying powers with the same base, add the exponents:
$2^3 \times 2^2 = 2^{3+2} = 2^5$
Now calculate 2^5:
$2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$
Answer: A. 32

Tip:

When working with indices/exponents, remember these rules:

- Multiplication: a^m × a^n = a^(m+n)
- Division: a^m ÷ a^n = a^(m-n)
- Power of a power: (a^m)^n = a^(m×n)
- Negative exponent: a^(-n) = 1/(a^n)
- Zero exponent: a^0 = 1 (except when a = 0)

Question 19: Proportion and Rate

A car travels 210 kilometres in 3 hours. At this rate, how far will it travel in 5 hours?

Solution:

Step 1: Find the rate (speed) of the car.
Rate = Distance ÷ Time = 210 km ÷ 3 hours = 70 km/hour
Step 2: Calculate the distance travelled in 5 hours.
Distance = Rate × Time = 70 km/hour × 5 hours = 350 km
Answer: 350 kilometres

Tip:

For rate and proportion problems, you can use:

1. The formula: Rate = Distance ÷ Time
2. Direct proportion: If y is directly proportional to x, then y = kx (where k is a constant).
3. Cross-multiplication for proportions: If a/b = c/d, then a × d = b × c.

Question 20: Financial Mathematics

Jason buys a jacket on sale for $84, which is 30% off the original price. What was the original price of the jacket?

Solution:

Step 1: Determine what percentage of the original price Jason paid.
If the discount is 30%, then Jason paid 100% - 30% = 70% of the original price.
Step 2: Set up an equation using the percentage paid and the sale price.
70% of original price = $84
0.7 × original price = 84
Step 3: Solve for the original price.
Original price = 84 ÷ 0.7 = $120
Answer: $120

Tip:

For discount and markup problems:

1. Remember that "discount" means a reduction from the original price.
2. To find the price after discount: New price = Original price × (1 - discount percentage)
3. To find the original price when given the discounted price: Original price = Discounted price ÷ (1 - discount percentage)

Measurement and Geometry (Questions 21-40)

Year 3-4 Level (Questions 21-27)

Question 21: Time

School starts at 9:15 am and finishes at 3:30 pm. How long is the school day?

Solution:

To find the duration, we need to calculate the time difference between the start and end times.
From 9:15 am to 3:30 pm:
9:15 am to 10:00 am = 45 minutes
10:00 am to 3:00 pm = 5 hours
3:00 pm to 3:30 pm = 30 minutes
Total time = 45 minutes + 5 hours + 30 minutes = 6 hours and 15 minutes
Answer: 6 hours and 15 minutes

Tip:

When calculating time durations:

1. Break the time period into manageable chunks (e.g., to the next hour, then full hours, then remaining minutes).
2. Remember that 1 hour = 60 minutes.
3. Be careful with am/pm notation and consider using 24-hour time to avoid confusion.

Question 22: Length Measurement

How many centimetres are there in 3.5 metres?

Solution:

To convert from metres to centimetres, multiply by 100:
3.5 metres = 3.5 × 100 = 350 centimetres
Answer: 350 centimetres

Tip:

For metric unit conversions, remember:

- Moving from a larger unit to a smaller unit: multiply
- Moving from a smaller unit to a larger unit: divide
- Common conversion factors:
  - 1 metre = 100 centimetres
  - 1 kilometre = 1,000 metres

- 1 centimetre = 10 millimetres

Question 23: 2D Shapes

How many sides does a hexagon have?

A. 5
B. 6
C. 7
D. 8

Solution:

The prefix "hex-" means six. Therefore, a hexagon has 6 sides.
Answer: B. 6

Tip:

Memorise the names of common polygons and their properties:

- Triangle: 3 sides
- Quadrilateral: 4 sides
- Pentagon: 5 sides
- Hexagon: 6 sides
- Heptagon or Septagon: 7 sides
- Octagon: 8 sides
- Nonagon: 9 sides
- Decagon: 10 sides

The prefixes often give clues: tri- (3), quad- (4), pent- (5), hex- (6), etc.

Question 24: Area

What is the area of a rectangle with length 8 cm and width 5 cm?

Solution:

The area of a rectangle is calculated using the formula:
Area = Length × Width
Area = 8 cm × 5 cm = 40 square centimetres (cm^2)
Answer: 40 cm^2

Tip:

Memorise these area formulas for common shapes:

- Rectangle: Area = Length × Width
- Square: Area = Side^2 (side squared)
- Triangle: Area = (Base × Height) ÷ 2
- Circle: Area = π × Radius^2

Remember that area is always measured in square units (cm^2, m^2, etc.).

Question 25: Directions and Location

Emma walks 3 blocks east, then 2 blocks north. Which direction must she walk to return directly to her starting point?

A. Southwest
B. Southeast
C. Northwest
D. Northeast

Solution:

Emma's movements can be visualised on a coordinate grid:
- She moves 3 blocks east (positive x-direction)
- Then 2 blocks north (positive y-direction)
To return directly to her starting point, she needs to move in the opposite direction of her total displacement.
This means she needs to move 3 blocks west and 2 blocks south, which is the same as moving southwest.
Answer: A. Southwest

Tip:

When working with directions and location:

1. Use a mental coordinate system with east as the positive x-direction and north as the positive y-direction.
2. Track movements in terms of their x and y components.
3. To return to the starting point, move in the opposite direction of the total displacement.
4. The four cardinal directions are North, East, South, and West. The four intermediate directions are Northeast, Southeast, Southwest, and Northwest.

Question 26: Perimeter

What is the perimeter of a square with side length 7 cm?

Solution:

The perimeter of a square is the sum of all four sides.
Since all sides of a square are equal, the perimeter can be calculated as:
Perimeter = 4 × Side length
Perimeter = 4 × 7 cm = 28 cm
Answer: 28 cm

Tip:

Memorise these perimeter formulas for common shapes:

- Square: Perimeter = 4 × Side
- Rectangle: Perimeter = 2 × (Length + Width)
- Triangle: Perimeter = Side 1 + Side 2 + Side 3
- Circle: Circumference = 2 × π × Radius or π × Diameter

Remember that perimeter is measured in linear units (cm, m, etc.), not square units.

Question 27: 3D Shapes

How many faces does a triangular prism have?

A. 3
B. 4
C. 5
D. 6

Solution:

A triangular prism has:
- 2 triangular faces (one at each end)
- 3 rectangular faces (forming the sides of the prism)
Total number of faces = 2 + 3 = 5 faces
Answer: C. 5

Tip:

When counting faces, edges, and vertices of 3D shapes:

- A face is a flat surface of the 3D shape.
- An edge is where two faces meet.

- A vertex is a point where three or more edges meet.

For a prism, the number of faces is always 2 + n, where n is the number of sides of the polygon forming the base.

Year 5-6 Level (Questions 28-34)

Question 28: Volume

What is the volume of a rectangular prism with length 4 cm, width 3 cm, and height 5 cm?

Solution:

The volume of a rectangular prism is calculated using the formula:
Volume = Length × Width × Height
Volume = 4 cm × 3 cm × 5 cm = 60 cubic centimetres (cm^3)
Answer: 60 cm^3

Tip:

Memorise these volume formulas for common 3D shapes:

- Rectangular prism: Volume = Length × Width × Height
- Cube: Volume = $Side^3$ (side cubed)
- Cylinder: Volume = π × $Radius^2$ × Height
- Sphere: Volume = (4/3) × π × $Radius^3$

Remember that volume is always measured in cubic units (cm^3, m^3, etc.).

Question 29: Angles

Which of the following angles is obtuse?

A. 45°
B. 90°
C. 120°
D. 30°

Solution:

An obtuse angle measures more than 90° but less than 180°.
Checking each option:
A. 45° - acute angle (less than 90°)
B. 90° - right angle (exactly 90°)

C. 120° - obtuse angle (between 90° and 180°)
D. 30° - acute angle (less than 90°)
Answer: C. 120°

Tip:

Know the classification of angles:

- Acute angle: Less than 90°
- Right angle: Exactly 90°
- Obtuse angle: Between 90° and 180°
- Straight angle: Exactly 180°
- Reflex angle: Between 180° and 360°

Visual memory: an obtuse angle looks "wide open" compared to a right angle.

Question 30: Transformations

What type of transformation moves a shape to a new position without changing its size or orientation?

A. Reflection
B. Rotation
C. Translation
D. Dilation

Solution:

Let's examine each transformation:
A. Reflection: Flips a shape over a line, changing its orientation.
B. Rotation: Turns a shape around a point, changing its orientation.
C. Translation: Moves a shape to a new position without changing its size or orientation.
D. Dilation: Changes the size of a shape (enlarges or reduces it) without changing its shape.
Answer: C. Translation

Tip:

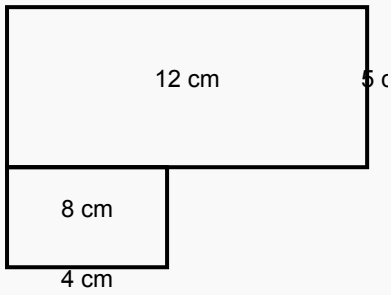
Understand the properties of different transformations:

- Translation: "Slides" a shape to a new position without changing size or orientation.
- Reflection: "Flips" a shape across a line, creating a mirror image.
- Rotation: "Turns" a shape around a point by a specific angle.

- Dilation: "Enlarges" or "reduces" a shape from a centre point by a scale factor.

Question 31: Area of Composite Shapes

Find the area of this composite shape:



Solution:

We can break this composite shape into two rectangles:
Rectangle 1: 12 cm × 5 cm = 60 cm^2
Rectangle 2: 8 cm × 4 cm = 32 cm^2
Total area = 60 cm^2 + 32 cm^2 = 92 cm^2
Answer: 92 cm^2

Tip:

To find the area of composite shapes:

1. Break the shape into simpler shapes (rectangles, triangles, etc.).
2. Calculate the area of each simple shape.
3. Add the areas together (for shapes that don't overlap) or subtract (for shapes with holes).
4. Double-check that you've included the entire shape without counting any area twice.

Question 32: Maps and Scale

On a map with a scale of 1:10,000, two towns are 4.5 cm apart. What is the actual distance between the towns in kilometres?

Solution:

A scale of 1:10,000 means that 1 cm on the map represents 10,000 cm in real life.
Step 1: Calculate the actual distance in centimetres.
Actual distance = Map distance × Scale
Actual distance = 4.5 cm × 10,000 = 45,000 cm

Step 2: Convert to kilometres.
45,000 cm = 45,000 ÷ 100,000 = 0.45 km
Answer: 0.45 kilometres

Tip:

When working with maps and scales:

1. Understand that a scale of 1:n means 1 unit on the map represents n units in real life.
2. To find the actual distance, multiply the map distance by the scale factor.
3. To find the map distance, divide the actual distance by the scale factor.
4. Pay attention to units: If the map distance is in cm and you want km, remember that 1 km = 100,000 cm.

Question 33: Capacity

A jug contains 1.75 litres of water. How many 250 ml glasses can be completely filled from this jug?

Solution:

Step 1: Convert all measurements to the same unit.
1.75 litres = 1.75 × 1,000 = 1,750 ml
Step 2: Calculate how many glasses can be filled.
Number of glasses = Total volume ÷ Volume per glass
Number of glasses = 1,750 ml ÷ 250 ml = 7 glasses
Answer: 7 glasses

Tip:

For capacity problems:

1. Ensure all measurements are in the same unit (usually litres or millilitres).
2. Common conversions: 1 litre = 1,000 millilitres, 1 kilolitre = 1,000 litres.
3. When dividing quantities to find how many items can be filled/used, check if a partial item makes sense in the context (e.g., you usually can't have a partial glass).

Question 34: Symmetry

How many lines of symmetry does a regular pentagon have?

A. 3

B. 4
C. 5
D. 10

Solution:

A regular pentagon has 5 lines of symmetry.
Each line of symmetry passes through a vertex and the midpoint of the opposite side.
Since a regular pentagon has 5 vertices, it has 5 lines of symmetry.
Answer: C. 5

Tip:

For regular polygons, the number of lines of symmetry equals the number of sides (or vertices):

- Equilateral triangle: 3 lines of symmetry
- Square: 4 lines of symmetry
- Regular pentagon: 5 lines of symmetry
- Regular hexagon: 6 lines of symmetry

For other shapes, a line of symmetry divides the shape into two halves that are mirror images of each other.

Year 7-9 Level (Questions 35-40)

Question 35: Pythagoras' Theorem

Find the length of the hypotenuse of a right-angled triangle with legs measuring 6 cm and 8 cm.

Solution:

We can use Pythagoras' theorem: In a right-angled triangle, the square of the hypotenuse equals the sum of the squares of the other two sides.
$c^2 = a^2 + b^2$
$c^2 = 6^2 + 8^2$
$c^2 = 36 + 64$
$c^2 = 100$
$c = \sqrt{100} = 10$
Answer: 10 cm

Tip:

When using Pythagoras' theorem:

1. Remember the formula: $c^2 = a^2 + b^2$ (where c is the hypotenuse and a and b are the legs of the right-angled triangle).
2. To find a leg when you know the hypotenuse and the other leg, rearrange the formula: $a^2 = c^2 - b^2$.
3. Memorise common Pythagorean triples like (3,4,5), (5,12,13), and (8,15,17) to solve some problems without calculations.

Question 36: Area of a Circle

What is the area of a circle with radius 7 cm? Use $\pi \approx 3.14$.

Solution:

The area of a circle is calculated using the formula:
Area = $\pi \times r^2$
Area = $3.14 \times 7^2 = 3.14 \times 49 = 153.86$
Answer: 153.86 cm^2

Tip:

For circle calculations:

- Area of a circle: $A = \pi r^2$
- Circumference of a circle: $C = 2\pi r$ or $C = \pi d$ (where d is the diameter)
- Common approximations for π: 3.14 or 22/7
- Remember that the diameter is twice the radius: $d = 2r$

Question 37: Coordinate Geometry

What are the coordinates of the midpoint of a line segment from (2, 3) to (8, 7)?

Solution:

To find the midpoint of a line segment, calculate the average of the x-coordinates and the average of the y-coordinates.
x-coordinate of midpoint = $(x_1 + x_2) \div 2 = (2 + 8) \div 2 = 10 \div 2 = 5$
y-coordinate of midpoint = $(y_1 + y_2) \div 2 = (3 + 7) \div 2 = 10 \div 2 = 5$
Answer: (5, 5)

Tip:

For coordinate geometry:

- Midpoint formula: $((x_1 + x_2) \div 2, (y_1 + y_2) \div 2)$
- Distance formula: $d = \sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$
- Slope formula: $m = (y_2 - y_1) \div (x_2 - x_1)$
- Equation of a line: $y = mx + b$ (where m is the slope and b is the y-intercept)

Question 38: Surface Area

Calculate the total surface area of a cube with side length 5 cm.

Solution:

A cube has 6 square faces, all with the same area.
Area of one face = Side length^2 = 5^2 = 25 cm^2
Total surface area = 6 × Area of one face = 6 × 25 = 150 cm^2
Answer: 150 cm^2

Tip:

For surface area calculations:

- Surface area of a cube: $6 \times s^2$ (where s is the side length)
- Surface area of a rectangular prism: $2(lw + lh + wh)$ (where l is length, w is width, and h is height)
- Surface area of a cylinder: $2\pi r^2 + 2\pi rh$ (where r is the radius and h is the height)
- Surface area of a sphere: $4\pi r^2$

Surface area represents the total area of all the faces of a 3D shape.

Question 39: Geometric Construction

A circle with centre O has a radius of 10 cm. Point P is 16 cm from O. If point Q lies on the circle, what is the closest possible distance from P to Q?

Solution:

Since P is 16 cm from the centre O, and the radius of the circle is 10 cm, P is outside the circle.
The closest point on the circle to P will be where the line from O to P intersects the circle.
The distance from P to this intersection point is:
$|OP|$ - radius = 16 cm - 10 cm = 6 cm

Answer: 6 cm

Tip:

For problems involving distances to circles:

1. Determine if the point is inside, on, or outside the circle by comparing its distance from the centre to the radius.
2. For a point outside the circle, the shortest distance to the circle is the distance to the centre minus the radius.
3. For a point inside the circle, the shortest distance to the circle is the radius minus the distance to the centre.

Question 40: Congruence and Similarity

Triangle ABC is similar to triangle DEF. If AB = 4 cm, BC = 6 cm, and DE = 10 cm, what is the length of EF?

Solution:

When two triangles are similar, their corresponding sides are proportional.
We can set up a proportion:
AB/DE = BC/EF
4/10 = 6/EF
4 × EF = 10 × 6
4 × EF = 60
EF = 60 ÷ 4 = 15
Answer: 15 cm

Tip:

For similar triangles:

- Corresponding angles are equal.
- Corresponding sides are proportional.
- The ratio of corresponding sides is called the scale factor.
- The ratio of areas of similar triangles equals the square of the scale factor.

For congruent triangles, all corresponding sides and angles are equal.

Statistics and Probability (Questions 41-50)

Year 3-6 Level (Questions 41-45)

Question 41: Reading Data from Tables

The table shows the favourite fruits of students in a class:

Fruit	Number of Students
Apple	8
Banana	12
Orange	6
Strawberry	4

How many more students prefer bananas than strawberries?

Solution:

Number of students who prefer bananas = 12
Number of students who prefer strawberries = 4
Difference = 12 - 4 = 8
Answer: 8 students

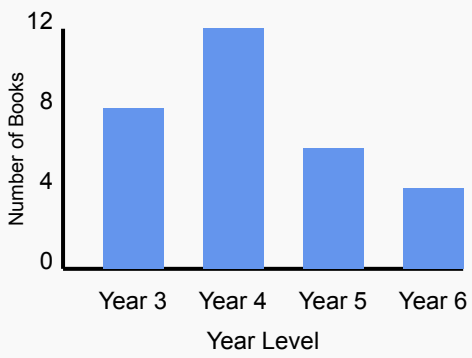
Tip:

When reading data from tables:

1. Carefully identify the rows and columns of interest.
2. For comparison questions, identify the specific values needed and then perform the required calculation (in this case, subtraction).
3. Double-check your work by referring back to the table.

Question 42: Bar Graphs

The bar graph shows the number of books read by students in a month:



What is the total number of books read by all students?

Solution:

Year 3: 8 books
Year 4: 12 books
Year 5: 6 books
Year 6: 4 books
Total number of books = 8 + 12 + 6 + 4 = 30 books
Answer: 30 books

Tip:

When interpreting bar graphs:

1. Read the title and axis labels to understand what the graph represents.
2. Use the scale on the vertical axis to determine the value of each bar.
3. For questions about totals, add the values of all relevant bars.
4. For questions about differences, subtract the values of the specified bars.

Question 43: Simple Probability

A bag contains 5 red marbles, 3 blue marbles, and 2 green marbles. If one marble is drawn at random, what is the probability of drawing a blue marble?

A. 1/10
B. 2/10
C. 3/10
D. 5/10

Solution:

Total number of marbles = 5 + 3 + 2 = 10
Number of blue marbles = 3
Probability of drawing a blue marble = Number of blue marbles / Total number of marbles
Probability = 3/10
Answer: C. 3/10

Tip:

For probability problems:

- Probability = Number of favorable outcomes / Total number of possible outcomes
- Probability is always between 0 and 1 (or 0% and 100%).

- Probability of 0 means the event is impossible.
- Probability of 1 means the event is certain.
- The sum of probabilities of all possible outcomes equals 1.

Question 44: Mean (Average)

Find the mean of these test scores: 85, 92, 78, 95, 80.

Solution:

To find the mean, add all the values and divide by the number of values.
Sum of test scores = 85 + 92 + 78 + 95 + 80 = 430
Number of test scores = 5
Mean = 430 ÷ 5 = 86
Answer: 86

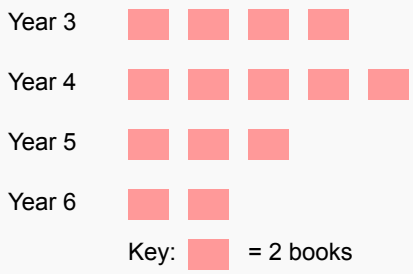
Tip:

For calculating the mean (average):

1. Add all the values in the data set.
2. Divide the sum by the number of values.
3. The mean can be affected significantly by very large or very small values (outliers).
4. The mean doesn't have to be a value that actually appears in the data set.

Question 45: Interpreting Pictographs

This pictograph shows the number of books read by students in a month:



Which year level read the most books, and how many did they read?

Solution:

From the pictograph, each symbol represents 2 books.
Year 3: 4 symbols × 2 books = 8 books
Year 4: 5 symbols × 2 books = 10 books

Year 5: 3 symbols × 2 books = 6 books
Year 6: 2 symbols × 2 books = 4 books
Year 4 read the most books: 10 books.
Answer: Year 4, 10 books

Tip:

When interpreting pictographs:

1. Check the key to understand what each symbol represents.
2. Count the number of symbols for each category and multiply by the value of each symbol.
3. Pay attention to partial symbols, which represent partial values.
4. Compare the calculated values to answer questions about "most," "least," "total," or "difference."

Year 7-9 Level (Questions 46-50)

Question 46: Median and Mode

Find the median and mode of this data set: 7, 9, 5, 8, 9, 12, 9, 6, 7.

Solution:

Step 1: Arrange the data in ascending order:
5, 6, 7, 7, 8, 9, 9, 9, 12
Step 2: Find the median (middle value):
The data set has 9 values, so the median is the 5th value: 8
Step 3: Find the mode (most frequent value):
5 appears once, 6 appears once, 7 appears twice, 8 appears once, 9 appears three times, 12 appears once.
The mode is 9 (it appears most frequently).
Answer: Median = 8, Mode = 9

Tip:

For calculating the median and mode:

- Median: Arrange the data in order and find the middle value. If there's an even number of values, take the average of the two middle values.
- Mode: Find the value that appears most frequently. A data set can have no mode, one mode, or multiple modes.

- The median is less affected by outliers than the mean.

Question 47: Compound Events

A fair six-sided die is rolled twice. What is the probability of rolling a 6 on the first roll and an even number on the second roll?

Solution:

Step 1: Find the probability of rolling a 6 on the first roll.
P(6 on first roll) = 1/6
Step 2: Find the probability of rolling an even number on the second roll.
Even numbers on a die are 2, 4, and 6, so there are 3 favorable outcomes out of 6 possible outcomes.
P(even on second roll) = 3/6 = 1/2
Step 3: Calculate the probability of both events occurring.
For independent events, multiply the individual probabilities:
P(6 on first AND even on second) = P(6 on first) × P(even on second) = 1/6 × 1/2 = 1/12
Answer: 1/12

Tip:

For compound probability problems:

1. Multiplication rule for independent events: P(A and B) = P(A) × P(B)
2. Addition rule for mutually exclusive events: P(A or B) = P(A) + P(B)
3. Addition rule for non-mutually exclusive events: P(A or B) = P(A) + P(B) - P(A and B)
4. Independent events don't affect each other; dependent events do affect each other.

Question 48: Range and Interquartile Range

Find the range and interquartile range of this data set: 15, 18, 7, 23, 12, 20, 8, 14.

Solution:

Step 1: Arrange the data in ascending order:
7, 8, 12, 14, 15, 18, 20, 23
Step 2: Find the range:
Range = Maximum value - Minimum value = 23 - 7 = 16
Step 3: Find the quartiles:
The data set has 8 values.

- The median (Q2) is the average of the 4th and 5th values: (14 + 15) ÷ 2 = 14.5
- The first quartile (Q1) is the median of the lower half: (8 + 12) ÷ 2 = 10
- The third quartile (Q3) is the median of the upper half: (18 + 20) ÷ 2 = 19

Step 4: Calculate the interquartile range (IQR):

IQR = Q3 - Q1 = 19 - 10 = 9

Answer: Range = 16, IQR = 9

Tip:

For calculating range and interquartile range:

- Range = Maximum value - Minimum value
- Interquartile Range (IQR) = Q3 - Q1
- Range measures the spread of the entire data set and is affected by outliers.
- IQR measures the spread of the middle 50% of the data and is resistant to outliers.

Question 49: Scatter Plots

A scatter plot shows the relationship between the height (in cm) and weight (in kg) of 10 students. The data points approximately follow a straight line from the bottom left to the top right of the graph. What type of correlation does this represent?

A. Positive correlation
B. Negative correlation
C. No correlation
D. Perfect correlation

Solution:

A scatter plot showing data points that trend from the bottom left to the top right indicates that as one variable increases, the other variable also tends to increase. This pattern represents a positive correlation between the variables.

Answer: A. Positive correlation

Tip:

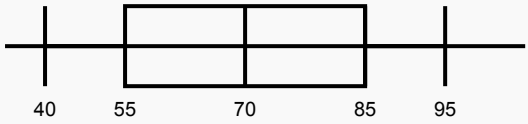
When interpreting scatter plots:

- Positive correlation: As one variable increases, the other tends to increase (bottom left to top right trend).
- Negative correlation: As one variable increases, the other tends to decrease (top left to bottom right trend).
- No correlation: No clear pattern between the variables (points scattered randomly).
- Perfect correlation: All points fall exactly on a straight line.

Remember, correlation does not necessarily imply causation.

Question 50: Interpreting Box Plots

The box plot shows the distribution of test scores for a class:



What is the median score, and what is the interquartile range (IQR)?

Solution:

From the box plot:
- The minimum value is 40.
- The first quartile (Q1) is 55.
- The median (Q2) is 70.
- The third quartile (Q3) is 85.
- The maximum value is 95.

The median is 70.
The interquartile range (IQR) = Q3 - Q1 = 85 - 55 = 30.
Answer: Median = 70, IQR = 30

Tip:

When interpreting box plots:

- The box represents the middle 50% of the data (from Q1 to Q3).
- The line inside the box represents the median (Q2).
- The "whiskers" extend to the minimum and maximum values (or to 1.5 times the IQR from the box, with outliers shown as separate points).
- The width of the box represents the IQR, which measures the spread of the middle 50% of the data.
- A box plot with a longer "tail" on one side indicates that the data is skewed in that direction.

Conclusion

This ebook has covered 50 essential mathematics questions that frequently appear in NAPLAN assessments. By practising these questions and understanding the solution strategies, students can build confidence and improve their performance in the numeracy component of NAPLAN.

Remember these key tips for success in NAPLAN numeracy:

- Read questions carefully to understand what is being asked.
- Show your working out, even in multiple-choice questions.
- Check your answers for reasonableness.
- Manage your time effectively during the test.
- Use the appropriate formula for each type of problem.
- Double-check calculations, especially when converting between units.
- Look for patterns and relationships in data.
- Use diagrams to help visualise geometric problems.

The questions in this ebook represent core mathematical concepts that are regularly assessed in NAPLAN. By mastering these question types, students will be well-prepared not only for the test but also for applying mathematical thinking in real-world contexts.

Regular practice with these question types, combined with a solid understanding of mathematical concepts, will help students approach NAPLAN with confidence and achieve their best results.

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