Fractions to Decimals Deep Dive

Converting, Comparing & Calculating for PSLE Excellence

Complete PSLE Syllabus Coverage | Primary 5 & 6 Focus | Advanced Problem Solving

Complete Guide Contents

Part 1: Understanding Fractions & Decimals

What are Fractions?

A fraction represents a part of a whole. It consists of two numbers:

- **Numerator** (top number): tells us how many parts we have
- **Denominator** (bottom number): tells us how many equal parts the whole is divided into

Visual Example: $\frac{3}{4}$

3 out of 4 parts are shaded

Types of Fractions

Proper Fraction: $\frac{2}{5}$ (numerator < denominator)

Improper Fraction: $\frac{7}{3}$ (numerator ≥ denominator)

Mixed Number: $2\frac{1}{3}$ (whole number + fraction)

Understanding Decimals

Decimals are another way to represent parts of a whole using place value. They use a decimal point to separate the whole number part from the fractional part.

Decimal Place Value Chart

Hundreds	Tens	Ones	•	Tenths	Hundredths	Thousandths
2	4	7	•	3	5	8

247.358 = Two hundred forty-seven and three hundred fifty-eight thousandths

Key Understanding

- 0.1 = one tenth = $\frac{1}{10}$
- 0.01 = one hundredth = $\frac{1}{100}$
- 0.001 = one thousandth = $\frac{1}{1000}$

= Equivalent Fractions

Equivalent fractions are fractions that represent the same value but have different numerators and denominators.

↑ Creating Equivalent Fractions

Method 1: Multiply both numerator and denominator by the same number

$$\frac{2}{3} = \frac{2\times2}{3\times2} = \frac{4}{6}$$

↓ Simplifying Fractions

Method 2: Divide both numerator and denominator by their common factor

$$\frac{8}{12} = \frac{8\div4}{12\div4} = \frac{2}{3}$$

⇄ Part 2: Converting Between Fractions & Decimals

→ Converting Fractions to Decimals

Key Rule: To convert a fraction to a decimal, divide the numerator by the denominator.

$\frac{a}{b} = a \div b$

Method 1: Direct Division

Example: Convert $\frac{3}{4}$ to a decimal

Step 1: Divide 3 ÷ 4

Step 2: 3.000 ÷ 4 = 0.75

Answer: $\frac{3}{4} = 0.75$

Method 2: Equivalent Denominator

Example: Convert $\frac{3}{5}$ to a decimal

Step 1: Make denominator 10, 100, or 1000

Step 2: $\frac{3}{5} \times \frac{2}{2} = \frac{6}{10}$

Answer: $\frac{6}{10} = 0.6$

Common Fraction to Decimal Conversions

$\frac{1}{2} = 0.5$	$\frac{1}{4} = 0.25$	$\frac{3}{4} = 0.75$
$\frac{1}{5} = 0.2$	$\frac{2}{5} = 0.4$	$\frac{4}{5} = 0.8$
$\frac{1}{8} = 0.125$	$\frac{3}{8} = 0.375$	$\frac{1}{10} = 0.1$

← Converting Decimals to Fractions

Key Steps: Write the decimal as a fraction over a power of 10, then simplify.

Step-by-Step Method

Example 1: Convert 0.75 to a fraction

Step 1: Count decimal places (2 places)

Step 2: Write as $\frac{75}{100}$

Step 3: Simplify by dividing by 25

Answer: $\frac{3}{4}$

Example 2: Convert 0.125 to a fraction

Step 1: Count decimal places (3 places)

Step 2: Write as $\frac{125}{1000}$

Step 3: Simplify by dividing by 125

Answer: $\frac{1}{8}$

Working with Mixed Numbers

Mixed numbers combine whole numbers and fractions. They're essential for PSLE mathematics.

→ Mixed Number to Improper Fraction

Example: Convert $2\frac{3}{4}$ to an improper fraction

Step 1: Multiply whole number by denominator: 2 × 4 = 8

Step 2: Add the numerator: 8 + 3 = 11

Step 3: Keep the same denominator

Answer: $\frac{11}{4}$

← Improper Fraction to Mixed Number

Example: Convert $\frac{17}{5}$ to a mixed number

Step 1: Divide numerator by denominator: 17 ÷ 5 = 3 remainder 2

Step 2: Whole number = quotient (3)

Step 3: Fraction = $\frac{\text{remainder}}{\text{divisor}} = \frac{2}{5}$

Answer: $3\frac{2}{5}$

Part 3: Operations with Fractions & Decimals

+ Adding Fractions

Same Denominators

Example: $\frac{2}{7} + \frac{3}{7}$

Step 1: Add numerators: 2 + 3 = 5

Step 2: Keep the same denominator: 7

Answer: $\frac{5}{7}$

Different Denominators

Example: $\frac{1}{3} + \frac{1}{4}$

Step 1: Find common denominator: LCM(3,4) = 12

Step 2: Convert: $\frac{4}{12} + \frac{3}{12}$

Step 3: Add: $\frac{4+3}{12} = \frac{7}{12}$

Answer: $\frac{7}{12}$

Adding Mixed Numbers

Example: $2\frac{1}{3} + 1\frac{1}{4}$

Method 1: Add whole numbers, then fractions

Whole: 2 + 1 = 3

Fractions: $\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

Answer: $3\frac{7}{12}$

− Subtracting Fractions

Subtraction Rules

Same Denominators

Example: $\frac{5}{8} - \frac{2}{8}$

Subtract numerators: 5 - 2 = 3

Answer: $\frac{3}{8}$

Different Denominators

Example: $\frac{3}{4} - \frac{1}{6}$

Common denominator: 12

$\frac{9}{12} - \frac{2}{12} = \frac{7}{12}$

× Multiplying Fractions

Key Rule: Multiply numerators together and denominators together

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d}$$

Fraction × Fraction

Example: $\frac{2}{3} \times \frac{4}{5}$

Step 1: Multiply numerators: 2 × 4 = 8

Step 2: Multiply denominators: 3 × 5 = 15

Answer: $\frac{8}{15}$

Fraction × Whole Number

Example: $\frac{3}{7} \times 4$

Step 1: Write 4 as $\frac{4}{1}$

Step 2: $\frac{3}{7} \times \frac{4}{1} = \frac{3 \times 4}{7 \times 1}$

Answer: $\frac{12}{7} = 1\frac{5}{7}$

⚠ Multiplying Mixed Numbers

Example: $2\frac{1}{2} \times 1\frac{1}{3}$

Step 1: Convert to improper fractions

$2\frac{1}{2} = \frac{5}{2}$ and $1\frac{1}{3} = \frac{4}{3}$

Step 2: Multiply: $\frac{5}{2} \times \frac{4}{3} = \frac{20}{6}$

Step 3: Simplify: $\frac{20}{6} = \frac{10}{3} = 3\frac{1}{3}$

Answer: $3\frac{1}{3}$

÷ Dividing Fractions

Key Rule: To divide by a fraction, multiply by its reciprocal (flip the fraction)

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$$

Fraction ÷ Fraction

Example: $\frac{3}{4} \div \frac{2}{5}$

Step 1: Change ÷ to × and flip second fraction

Step 2: $\frac{3}{4} \times \frac{5}{2}$

Step 3: Multiply: $\frac{3\times5}{4\times2} = \frac{15}{8}$

Answer: $\frac{15}{8} = 1\frac{7}{8}$

Fraction ÷ Whole Number

Example: $\frac{2}{3} \div 4$

Step 1: Write 4 as $\frac{4}{1}$

Step 2: $\frac{2}{3} \div \frac{4}{1} = \frac{2}{3} \times \frac{1}{4}$

Step 3: $\frac{2\times1}{3\times4} = \frac{2}{12} = \frac{1}{6}$

Answer: $\frac{1}{6}$

Decimal Operations

Adding & Subtracting Decimals

Multiplying Decimals

Example: 23.67 + 8.94

```
  23.67
+  8.94
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  32.61
```

Align decimal points and add/subtract as normal

Example: 2.3 × 1.7

Step 1: Multiply without decimal points: 23 × 17 = 391

Step 2: Count decimal places: 1 + 1 = 2

Step 3: Place decimal point: 3.91

Answer: 3.91

Multiplying/Dividing by Powers of 10

×10
Move decimal point 1 place right
3.45 × 10 = 34.5

×100
Move decimal point 2 places right
3.45 × 100 = 345

÷10
Move decimal point 1 place left
34.5 ÷ 10 = 3.45

Part 4: Comparing & Ordering Fractions and Decimals

> Comparing Fractions

Same Denominators

Compare: $\frac{3}{7}$ and $\frac{5}{7}$

Same denominators → compare numerators

$3 < 5$

Therefore: $\frac{3}{7} < \frac{5}{7}$

Different Denominators

Compare: $\frac{2}{3}$ and $\frac{3}{4}$

Find common denominator: LCM(3,4) = 12

$\frac{2}{3} = \frac{8}{12}$ and $\frac{3}{4} = \frac{9}{12}$

$8 < 9$

Therefore: $\frac{2}{3} < \frac{3}{4}$

Cross Multiplication Method

Compare: $\frac{4}{7}$ and $\frac{5}{9}$

Cross multiply: $4 \times 9 = 36$ and $5 \times 7 = 35$

$36 > 35$

Therefore: $\frac{4}{7} > \frac{5}{9}$

Comparing Decimals

Step-by-Step Method

Compare: 2.34, 2.341, 2.4

Step 1: Align decimal points

```
2.340
2.341
2.400
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Step 2: Compare from left to right

Ones place: all 2 ✓

Tenths place: all 3 for first two, 4 for third

Since 4 > 3, we have 2.4 > 2.34 and 2.4 > 2.341

Hundredths place: 4 > 1, so 2.341 > 2.34

Order: 2.34 < 2.341 < 2.4

Comparing Fractions and Decimals

Two Methods Available

Method 1: Convert to Decimals

Compare: $\frac{3}{4}$ and 0.8

Method 2: Convert to Fractions

Compare: $\frac{3}{4}$ and 0.8

$\frac{3}{4} = 3 \div 4 = 0.75$

Compare: 0.75 and 0.8

$0.75 < 0.8$

Therefore: $\frac{3}{4} < 0.8$

$0.8 = \frac{8}{10} = \frac{4}{5}$

Compare: $\frac{3}{4}$ and $\frac{4}{5}$

Common denominator: 20

$\frac{15}{20}$ and $\frac{16}{20}$

Therefore: $\frac{3}{4} < 0.8$

Ordering Practice

Practice Exercise: Order from smallest to largest

Given: 0.7, $\frac{3}{5}$, 0.65, $\frac{2}{3}$

Step 1: Convert all to decimals

- 0.7 = 0.7
- $\frac{3}{5}$ = 0.6
- 0.65 = 0.65
- $\frac{2}{3}$ = 0.667 (rounded)

Solution:

Step 2: Order the decimals

$0.6 < 0.65 < 0.667 < 0.7$

Step 3: Write in original form

Answer: $\frac{3}{5} < 0.65 < \frac{2}{3} < 0.7$

Part 5: Problem Solving Strategies

Word Problems with Fractions

Problem-Solving Steps

1. READ	2. IDENTIFY	3. PLAN	4. SOLVE
	Key information	Choose operation	

Understand the problem

Calculate and check

Example Problem 1

Sarah ate $\frac{2}{5}$ of a pizza. Her brother ate $\frac{1}{4}$ of the same pizza. How much pizza did they eat altogether?

Step 1: Identify - Need to find total amount eaten (addition)

Step 2: Set up - $\frac{2}{5} + \frac{1}{4}$

Step 3: Find common denominator - LCM(5,4) = 20

Step 4: Convert - $\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$

Answer: They ate $\frac{13}{20}$ of the pizza altogether.

Example Problem 2

A recipe calls for $\frac{3}{4}$ cup of flour. How much flour is needed to make $\frac{1}{2}$ of the recipe?

Step 1: Identify - Need to find half of $\frac{3}{4}$ (multiplication)

Step 2: Set up - $\frac{3}{4} \times \frac{1}{2}$

Step 3: Multiply - $\frac{3\times1}{4\times2} = \frac{3}{8}$

Answer: $\frac{3}{8}$ cup of flour is needed.

Word Problems with Decimals

Money Problems

Tom bought 3 notebooks for $2.45 each and 2 pens for $1.25 each. How much did he spend in total?

Step 1: Calculate cost of notebooks: 3 × $2.45 = $7.35

Step 2: Calculate cost of pens: 2 × $1.25 = $2.50

Step 3: Add total costs: $7.35 + $2.50 = $9.85

Answer: Tom spent $9.85 in total.

Measurement Problems

A piece of ribbon 5.8 metres long is cut into 4 equal pieces. How long is each piece?

Step 1: Identify operation needed (division)

Step 2: Set up: 5.8 ÷ 4

Step 3: Calculate: 5.8 ÷ 4 = 1.45

Answer: Each piece is 1.45 metres long.

Real-world Applications

Data and Statistics

In a survey, $\frac{3}{8}$ of students chose maths as their favourite subject, 0.25 chose science, and $\frac{1}{4}$ chose English. Which subject was most popular?

Convert to compare:

Maths: $\frac{3}{8}$ = 0.375

Science: 0.25

Cooking and Recipes

A recipe for 6 people uses 1.5 kg of flour. How much flour is needed for 10 people?

Find flour per person: 1.5 ÷ 6 = 0.25 kg

For 10 people: 0.25 × 10 = 2.5 kg

Answer: 2.5 kg of flour is needed

English: $\frac{1}{4} = 0.25$

Answer: Maths was most popular (0.375 > 0.25)

PSLE Examination Techniques

Key Strategies for Success

Before You Start:

- Read the question carefully
- Identify what you need to find
- Circle key numbers and words
- Check if answer should be fraction or decimal

During Calculation:

- Show all working steps
- Simplify fractions when possible
- Check decimal point placement
- Use estimation to verify answers

Common Checking Methods

Estimation	Reverse Operation	Substitution
Round numbers to check if answer is reasonable	Use inverse operation to check answer	Put answer back into original problem

Part 6: Advanced Techniques & Mastery

Advanced Fraction Techniques

Cross-Cancellation in Multiplication

Example: $\frac{6}{8} \times \frac{4}{9}$

Instead of: $\frac{6\times4}{8\times9} = \frac{24}{72} = \frac{1}{3}$

Use cross-cancellation:

Cancel 6 and 9 (÷3): $\frac{2}{8} \times \frac{4}{3}$

Cancel 4 and 8 (÷4): $\frac{2}{2} \times \frac{1}{3} = \frac{2\times1}{2\times3} = \frac{1}{3}$

Much easier and less chance of error!

÷ Complex Division Problems

Problem: How many $\frac{2}{3}$ metre pieces can be cut from $5\frac{1}{3}$ metres of rope?

Step 1: Convert mixed number: $5\frac{1}{3} = \frac{16}{3}$

Step 2: Set up division: $\frac{16}{3} \div \frac{2}{3}$

Step 3: Change to multiplication: $\frac{16}{3} \times \frac{3}{2}$

Step 4: Calculate: $\frac{16\times3}{3\times2} = \frac{48}{6} = 8$

Answer: 8 pieces can be cut

Advanced Decimal Techniques

Rounding and Estimation

Rounding Rules

- Look at the digit to the right
- If ≥ 5, round up
- If < 5, round down
- Replace following digits with zeros

Examples

- 3.67 → 3.7 (to 1 d.p.)
- 3.67 → 4 (to nearest whole)
- 2.349 → 2.35 (to 2 d.p.)
- 2.349 → 2.3 (to 1 d.p.)

⚠ Recurring Decimals

Some fractions create recurring decimals:

$\frac{1}{3} = 0.333...$ or $0.\bar{3}$

$\frac{2}{3} = 0.666...$ or 0.6^{-}

$\frac{1}{6} = 0.1666...$ or 0.16^{-}

For PSLE, usually round to 2-3 decimal places when needed.

Common Mistakes to Avoid

✕ Fraction Mistakes

✕ Adding denominators

$\frac{1}{4} + \frac{1}{6} \neq \frac{2}{10}$

✅ Find common denominator first

✕ Forgetting to simplify

Always check if answer can be simplified

✅ $\frac{6}{8} = \frac{3}{4}$

✕ Wrong operation in division

Forgetting to flip the second fraction

✅ $a \div b = a \times \frac{1}{b}$

✕ Decimal Mistakes

✕ Misaligning decimal points

In addition/subtraction, always align decimal points

✅ Line up vertically before calculating

✕ Wrong decimal places in multiplication

Count total decimal places in both numbers

✅ 2.3 × 1.7 = 3.91 (1+1=2 places)

✕ Moving decimal point wrong way

×10 moves right, ÷10 moves left

✅ 3.45 × 10 = 34.5

PSLE Examination Strategies

Time Management Tips

Paper 1 (MCQ)

- 45 minutes for 28 questions
- ≈ 1.5 minutes per question

Paper 2 (Open-ended)

- 1 hour for 12-13 questions
- ≈ 4-5 minutes per question

General Tips

- Read questions carefully
- Use estimation to check
- Convert fractions/decimals as

- Skip difficult ones first
- Return to review

- Show all working
- Check answers if time permits

needed
- Simplify final answers

Success Formula for PSLE Mathematics

Master Basics
Know fraction/decimal conversions by heart

Practice Regularly
Solve different types of problems daily

Time Yourself
Practice under exam conditions

Check Answers
Always verify using different methods

Quick Reference Guide

Fraction Essentials

Common Conversions:

$\frac{1}{2}$ = 0.5 | $\frac{1}{4}$ = 0.25 | $\frac{3}{4}$ = 0.75

$\frac{1}{5}$ = 0.2 | $\frac{1}{8}$ = 0.125 | $\frac{1}{10}$ = 0.1

Operations:

Add/Subtract: Common denominator

Multiply: Straight across

Divide: Multiply by reciprocal

Decimal Essentials

Place Values:

0.1 = tenths | 0.01 = hundredths

0.001 = thousandths

Powers of 10:

×10: Move point 1 place right

×100: Move point 2 places right

÷10: Move point 1 place left

Rounding: Look at next digit

≥5: Round up | <5: Round down

Problem Solving

Steps:

1. Read carefully
2. Identify key information
3. Choose operation
4. Calculate and check

Check Methods:

- Estimation
- Reverse operation
- Substitute answer back

Achieve PSLE Excellence

Master fractions and decimals with confidence using this comprehensive guide

- Complete Syllabus Coverage
- Worked Examples
- Examination Strategies