Fractions, Decimals, Percentages & Ratios

Matthew Williams • Math • May 6, 2026

Fractions, decimals, percentages, and ratios are different ways to compare parts to wholes. They appear throughout the syllabus, especially in Consumer Arithmetic, Measurement, Statistics, and Probability.

For CSEC, fluency matters because these conversions are often only one step inside a bigger problem. Before calculating, decide what the whole is, what part is being compared, and whether the question wants a fraction, decimal, percentage, or ratio. That interpretation is what turns a procedure into understanding.

These three forms represent the **exact same thing, just written differently**. Converting between them fluently is an essential skill.

Study Vault

What Is a Fraction?

A fraction only makes sense when the whole is clear. In word problems, identify the total amount before deciding what the numerator and denominator should be.

A fraction shows **a part of something whole**.

$$\frac{3}{4}$$

- **Top number (numerator):** How many parts you have = 3
- **Bottom number (denominator):** How many equal parts the whole is divided into = 4

So $\frac{3}{4}$ means: "The whole thing is divided into 4 equal parts, and you have 3 of them."

> 📋 **Example**
> If a pizza is cut into 4 equal slices and you eat 3 of them, you ate $\frac{3}{4}$ of the pizza.

Converting Fraction to Decimal

Decimal form is useful for comparisons and calculator work. The division asks how large each fractional part is in the base-10 number system.

To convert a fraction to decimal: Divide the top by the bottom.

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

$$\frac{1}{2} = 1 \div 2 = 0.5$$

$$\frac{5}{8} = 5 \div 8 = 0.625$$

📋 **Example**

Convert $\frac{7}{10}$ to a decimal.

$7 \div 10 = 0.7$

So $\frac{7}{10} = 0.7$

Converting Decimal to Percentage

Percent means "per hundred", so multiplying by 100 rewrites the decimal as a number out of 100.

To convert decimal to percentage: Multiply by 100 and add the % sign.

$$0.75 \times 100 = 75\%$$

$$0.5 \times 100 = 50\%$$

$$0.25 \times 100 = 25\%$$

📋 **Example**

Convert 0.85 to a percentage.

$0.85 \times 100 = 85\%$

Converting All Three

Seeing all three forms together helps you choose the most convenient one. Fractions are often exact, decimals are calculator-friendly, and percentages are easiest for real-life comparison.

Now let's see how all three forms are the SAME number:

$$\frac{3}{4} = 0.75 = 75\%$$

They're three different ways of writing the same value.

📋 **Example**

Convert $\frac{1}{5}$ to all three forms:

Step 1 - Fraction: $\frac{1}{5}$ (already given)

Step 2 - Decimal: $1 \div 5 = 0.2$

Step 3 - Percentage: $0.2 \times 100 = 20\%$

So: $\frac{1}{5} = 0.2 = 20\%$

All three are the same!

🧠 **Remember**

Fraction ’Decimal: Divide top by bottom

Decimal ’Percentage: Multiply by 100

Percentage ’Decimal: Divide by 100

Decimal ’Fraction: Put over a power of 10 (0.5 = $\frac{5}{10} = \frac{1}{2}$)

Working with Fractions

Adding Fractions

Adding fractions means combining parts of the same-sized whole. If the denominators differ, the fractions must first be rewritten with a common denominator before the numerators can be combined.

To add fractions, the denominators must be the SAME.

📋 Example

Problem: $\frac{1}{4} + \frac{1}{4}$

They already have the same denominator (4), so just add the tops:

$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

But what if the denominators are different?

📋 Example

Problem: $\frac{1}{3} + \frac{1}{2}$

These have different denominators (3 and 2).

Step 1: Find the Least Common Multiple (LCM) of 3 and 2.

LCM of 3 and 2 = 6

Step 2: Convert both fractions to sixths.

$\frac{1}{3} = \frac{2}{6}$ (multiply top and bottom by 2)

$\frac{1}{2} = \frac{3}{6}$ (multiply top and bottom by 3)

Step 3: Now add them.

$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$

Multiplying Fractions

Multiplication of fractions often means "a fraction of a fraction". For example, half of three quarters is found by multiplying the fractions.

To multiply fractions: Multiply the tops together and the bottoms together.

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

📋 Example

Problem: $\frac{2}{3} \times \frac{3}{5}$

$\frac{2}{3} \times \frac{3}{5} = \frac{2 \times 3}{3 \times 5} = \frac{6}{15} = \frac{2}{5}$

(We simplified by dividing top and bottom by 3)

Dividing Fractions

Dividing by a fraction asks how many of that fraction fit into the first amount. Flipping and multiplying is the shortcut that preserves that meaning.

To divide fractions: Flip the second fraction, then multiply.

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

📋 **Example**

Problem: $\frac{3}{4} \div \frac{1}{2}$

Step 1: Flip the second fraction: $\frac{1}{2}$ becomes $\frac{2}{1}$

Step 2: Multiply: $\frac{3}{4} \times \frac{2}{1} = \frac{6}{4} = \frac{3}{2}$

🧠 **Remember**

For division: Flip and multiply!

This is one of the most important fraction rules in CSEC.

Understanding Percentages in Real Life

A percentage is just a way of saying "out of 100."

$50\% = \frac{50}{100}$

$25\% = \frac{25}{100}$

$1\% = \frac{1}{100}$

Finding a Percentage of a Number

This is the most common percentage skill in consumer arithmetic. Convert the percentage to a decimal or fraction first, then multiply by the whole amount.

To find X% of a number, multiply the number by $\frac{X}{100}$.

> 📋 **Example**
> **Problem:** Find 20% of 150.
> $$20\% \times 150 = \frac{20}{100} \times 150 = 0.2 \times 150 = 30$$
> So 20% of 150 is 30.

Expressing One Amount as a Percentage of Another

Here the first amount is the part and the second amount is the whole. Reversing them gives a completely different percentage, so read the wording carefully.

Formula: $\frac{\text{Part}}{\text{Whole}} \times 100\%$

> 📋 **Example**
> **Problem:** 15 students out of 60 passed an exam. What percentage passed?
> $$\frac{15}{60} \times 100\% = 0.25 \times 100\% = 25\%$$
> So 25% of students passed.

Study Vault

Percentage Increase and Decrease

Percentage change always compares the change to the original value. This is why the old value goes in the denominator, not the new value.

Formula: $\frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100\%$

> 📋 **Example**
> **Problem:**A shirt was $40.It'snowonsalefor$ 32. What's the percentage decrease?
> $$\frac{32-40}{40} \times 100\% = \frac{-8}{40} \times 100\% = -20\%$$
> The price decreased by 20%.

Ratios: Comparing Quantities

A ratio compares **two quantities of the same type**.

The ratio $2:3$ (read as "2 to 3") means:

"For every 2 of one thing, there are 3 of another thing."

Example of Ratios

Ratios compare quantities in a fixed order. "Boys to girls" is not the same as "girls to boys", so keep the order from the question.

> 📋 **Example**
>
> **Problem:** A class has 12 boys and 18 girls. What is the ratio of boys to girls?
>
> Ratio = $12 : 18$
>
> But we can simplify this. Find the GCD (Greatest Common Divisor) of 12 and 18, which is 6.
>
> Divide both numbers by 6:
> $12 : 18 = 2 : 3$
>
> This simplified ratio means: "For every 2 boys, there are 3 girls."

Dividing an Amount in a Given Ratio

A total amount can be **split into parts** according to a ratio.

> 📋 **Example**
>
> **Problem:** Divide $350 among three people in the ratio 2:3:5.
>
> **Step 1:** Add all the parts in the ratio.
>
> $2 + 3 + 5 = 10$ parts total
>
> **Step 2:** Find the value of each part.
>
> $\frac{350}{10} = 35$ (each part is worth $35)
>
> **Step 3:** Multiply each ratio number by the value per part.
>
> - Person 1 gets: $2 \times 35 = 70$
> - Person 2 gets: $3 \times 35 = 105$
> - Person 3 gets: $5 \times 35 = 175$
>
> **Check:** $70 + 105 + 175 = 350$
>
> This is correct!