

Name _____

Date _____

Unit 7 · Fractions — revision sheet

Everything you need from every section. Read it before the end-of-unit test.

7.1 Fractions and equivalence

- The **denominator** says how many equal parts make the whole; the **numerator** says how many you have.
- Multiply or divide **both** parts by the same number to get an **equivalent** fraction. Adding does not work.
- To **simplify**, divide both parts by their HCF — one step, not several.
- To **compare**, rewrite both over a common denominator, then compare the numerators.
- The lowest common denominator is the LCM of the two denominators.
- An **improper** fraction is at least 1; a **mixed number** shows the whole part separately.
- $7/4 \rightarrow 7 \div 4 = 1$ remainder 3 $\rightarrow 1 \frac{3}{4}$. Going back: $1 \times 4 + 3 = 7$.
- Never compare numerators until the denominators match — that is the commonest mistake in this unit.

Key words: numerator · denominator · equivalent fractions · simplest form · improper fraction · mixed number · common denominator

$3/4 \rightarrow 4$ equal parts, you have 3
 $1/8 \rightarrow 8$ equal parts, you have 1
 $1/8 < 1/2$ because eighths are smaller than halves
 $1/2 = 2/4 = 3/6 = 50/100$ ✓
 $1/2 \rightarrow$ add 1 to each $\rightarrow 2/3 \times$ different value
 $18/24$ HCF is 6
 $18 \div 6 = 3, 24 \div 6 = 4$

7.2 Adding and subtracting fractions

- You can only add or subtract fractions when the **denominators match** — the parts must be the same size.
- Find the **lowest common denominator**: the LCM of the two denominators.
- Rewrite each fraction over that denominator, then add or subtract the **numerators only**.
- The denominator does not change when you add. $2/7 + 3/7 = 5/7$, not $5/14$.
- Simplify the answer, and write an improper answer as a mixed number if the question is in mixed numbers.
- For mixed numbers, either add the parts separately or convert to improper fractions first.
- For **subtracting** mixed numbers, converting to improper fractions avoids borrowing — it is the safer route.
- Estimate first: $1/2 + 1/3$ must be more than $1/2$, so an answer of $2/5$ is wrong before you check anything else.

Key words: common denominator · lowest common denominator · equivalent fraction · mixed number · simplify

$1/2 + 1/3$ parts are different sizes
 $= 3/6 + 2/6$ now both are sixths
 $= 5/6$
 $3/4 + 1/6$
 LCM of 4 and 6 is 12
 $= 9/12 + 2/12$
 $= 11/12$

7.3 Multiplying fractions

- To multiply fractions: **multiply the numerators, multiply the denominators**.
- No common denominator is needed — that step belongs to adding and subtracting.
- The word **of** means multiply: $1/2$ of $3/4$ is $1/2 \times 3/4$.
- Multiplying by a fraction **less than 1 makes a number smaller**. That is not a mistake.
- **Cancel first** where you can — it keeps the numbers small and the simplifying easy.
- To multiply by a whole number, divide by the denominator then multiply by the numerator: $3/4 \times 8 = 8 \div 4 \times 3 = 6$.
- For mixed numbers, convert to improper fractions before multiplying.
- Check by size: $3/4$ of 8 must be less than 8 but more than half of it.

Key words: product · of · cancel · square

$2/3 \times 3/4$
 tops: $2 \times 3 = 6$
 bottoms: $3 \times 4 = 12$
 $= 6/12 = 1/2$
 $3/4$ of 20
 $= 3/4 \times 20$
 $= 60/4 = 15$

7.4 Dividing fractions

- The **reciprocal** of a fraction is that fraction upside down. The reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$.
- A number times its reciprocal is **1**.
- To divide by a fraction, **multiply by its reciprocal**: keep, flip, multiply.
- Dividing by a fraction **less than 1 makes the answer bigger** — you are asking how many small pieces fit in.
- Dividing by a whole number n is the same as multiplying by $\frac{1}{n}$.
- A whole number is a fraction over 1, so the reciprocal of 4 is $\frac{1}{4}$.
- For mixed numbers, convert to improper fractions before dividing.
- Check by size: $6 \div \frac{1}{2}$ must be more than 6, because halves are small.

Key words: reciprocal · divide · invert

$6 \div 2 = 3$
 $6 \div \frac{1}{2} = 12$
 small divisor → big answer
 $\frac{3}{5} \rightarrow \frac{5}{3}$ $\frac{3}{5} \times \frac{5}{3} = 1$
 $4 \rightarrow \frac{1}{4}$ $4 \times \frac{1}{4} = 1$
 $\frac{1}{8} \rightarrow 8$
 $\frac{3}{4} \div \frac{1}{2}$

7.5 Making fraction calculations easier

- Look at a calculation before you start it — the order is your choice.
- **Cancel first** when multiplying, so the numbers stay small and the answer is already simplified.
- For a fraction of a quantity, **divide first, then multiply**: $\frac{3}{4}$ of 48 is $48 \div 4 \times 3$, not $48 \times 3 \div 4$.
- In an addition, **reorder** to pair fractions that make a whole: $\frac{1}{4} + \frac{1}{2} + \frac{3}{4}$ becomes $1 + \frac{1}{2}$.
- Spot **reciprocals**: $\frac{5}{8} \times \frac{8}{5} = 1$, no working needed.
- Addition and multiplication may be reordered freely; subtraction and division may not.
- Estimating first tells you roughly what to expect, so a slip stands out.
- The efficient route is not a different method — it is the same method, done in a kinder order.

Key words: cancel · reciprocal · commutative · efficient

$\frac{3}{4}$ of 48
 $48 \times 3 = 144$, then $\div 4 = 36$
 $48 \div 4 = 12$, then $\times 3 = 36$ ← kinder
 $\frac{4}{9} \times \frac{3}{8}$
 4 and 8 share 4; 3 and 9 share 3
 $= \frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$
 $\frac{5}{6}$ of 72