

Substitute Guide: Fractions and Decimals: Compare and Combine

Grade: 4 **Subject:** Mathematics **Time:** ~45 min core + ~15 min extension Math

Learning goal (plain language)

Students practice **equivalent fractions, comparing fractions, adding and subtracting fractions that have the same bottom number, and writing tenths and hundredths as fractions and decimals. You do not need a math background to run this.** Every method and a worked example are printed in the student packet. Students **show their work; you do not need to teach the method** — the packet does the teaching. Your job is to hand it out, read the start script, keep the room on task, and collect the packets. This whole guide takes about 5 minutes to read.

Standards alignment

Framework: 19 TAC §111.6 (Grade 4 Mathematics). Number and operations — fractions and decimals.

- **Equivalence & comparison:** find equivalent fractions and compare two fractions with the same denominator using a model.
- **Fractions:** add and subtract fractions with **like (equal) denominators**.
- **Connections:** relate a fraction with a denominator of 10 or 100 to its decimal (tenths and hundredths).

Provisional — pending educator verification against the current official TAC source.

(Standards are paraphrased here, not quoted. Please confirm codes and wording against your official source. This is **not** a claim of TEKS alignment.)

Setup Before class (5 min)

- Count and hand out one **student packet** per student.
- Confirm each student has a **pencil**. A **basic calculator is allowed but not required**; students who have one may use it.
- Write the date on the board and remind students to fill in the name line.
- Keep the **answer key** with you — it is a separate file and is **not** in the student packet.

Materials What's needed

- Printed student packet (4–6 pages) per student.
- Pencil per student; a basic four-function calculator is optional.
- This guide and the separate answer key (teacher only).
- No technology, no internet, no special supplies, no physical manipulatives.

Timing Suggested pacing (~45–60 min)

Segment	Time	What students do
Start — Warm-up	5 min	Q1–Q2 (name a fraction, which is bigger)
Build — Study the math	5–10 min	Read reference box, worked example, area model; Q3–Q4
Apply — Use what you know	20–25 min	Q5–Q8 (compare, ribbon story, fraction–decimal match, error analysis)
Explain — Justify (Answer/Model/Why)	5–10 min	Q9 short explanation
Close — ACE	5 min	Articulate / Connect / Extend
Continue — early finishers	optional ~15 min	Draw a model for 4/6

Script Read aloud to start

"Today's assignment is a paper math packet called *Fractions and Decimals: Compare and Combine*. You will work by yourself with a pencil. A basic calculator is allowed if you have one, but you do not need one. The most important rule: **show your work** — write down the steps you use, not just a final answer. Everything you need is printed in the packet, including a worked example and a picture that shows how to add fractions. Start with the warm-up, then read the Build section before the Apply questions. If a question is tricky, skip it and come back. Put your name, class period, and date at the top now. You have about 45 minutes; raise your hand if you need help reading a question."

Support When students ask for help

- **Students show their work; you do not need to teach the method.** Point them back to the printed **reference box**, the **worked example**, and the **picture (Figure 2)** — the method is right there.
- **You may read any part aloud** to a student or the class.
- If a student is stuck adding fractions, prompt with "Are the bottom numbers the same?" and "If they match, you add just the tops and keep the bottom" — rather than giving the answer.
- For comparing, remind them that when the bottoms match, the fraction with the bigger **top** is bigger.
- For the decimal match, have them read the fraction aloud: "three tenths" is 0.3; "three hundredths" is 0.03.
- It is fine if a student cannot finish the optional early-finisher challenge.

Access Accommodations & language support

- **Read-aloud** of any question is allowed for all students.
- Point students to the **worked example**, the short numbered **steps** in the reference box, the **area model**, and the **sentence starters** for Q9 and ACE.
- A **calculator is allowed** for any student who wants one — this removes the arithmetic barrier so students can focus on the reasoning.
- Extended time is fine; the core can stop after Q9 if time runs short.
- Students may show work with numbers, simple pictures, and short phrases if writing full sentences is a barrier, as long as the reasoning is clear.
- The packet is grayscale-safe — pictures use patterns, not color, so it prints and reads clearly in black and white.

Tools Allowed & not allowed

Allowed: pencil, the printed packet, a basic (four-function) calculator, quiet self-read-aloud. **Not needed / not allowed:** phones, internet, graphing/AI calculators, or getting answers from another student.

Collect at the end: Collect every packet, whether finished or not, with names on them. Stack them for the teacher. Note on a sticky how far most students got and any questions that caused confusion. Answer key: The **answer key is a separate file** (answerkey.html) and is for the teacher only. Please do not hand it to students.

Teacher follow-up (for the returning teacher)

The highest-value items to review next class are the **error analysis (Q8)** and the **justification (Q9)**, which reveal the "add the denominators" misconception and whether students understand *why* the bottom stays the same when denominators are alike. Watch for "**bigger bottom = bigger fraction**" in Q2 and Q5, and the **0.3 vs 0.03** place-value slip in Q7. The separate answer key lists worked steps, alternate strategies, common misconceptions, and a 3-point rubric for Q9.

G04_MATH_FractionsDecimals_01 — Fractions and Decimals: Compare and Combine Substitute Guide

Fractions and Decimals: Compare and Combine

Grade: 4 **Subject:** Mathematics **Time:** ~45 min core + ~15 min extension **Work mode:** Independent · pencil + packet Math

Start Here

This is a **paper math packet** about fractions and decimals. Work by yourself with a pencil.

1. **A calculator is not required.** A basic calculator is allowed if you have one.
2. **Show your work.** Write the steps you used, not just a final number.
3. Everything you need is printed here, including a worked example.
4. If a question is hard, skip it, keep going, and come back.
5. **Box your final answers.**

Start Warm-Up 5 min

Bring back what you already know about fractions.

1**Name the fraction.** The bar below is cut into equal parts, and some parts are shaded. Write the fraction of the whole bar that is **shaded**.



Figure 1. A bar cut into equal parts, with some parts shaded.

2**Which is bigger?** Circle the larger fraction, then finish the sentence: $\frac{3}{4}$ or $\frac{1}{4}$. (Both are cut into fourths — the same size parts.)

The bigger fraction is ____ because _____.

Build Study the Math 5–10 min

What you need to know

Equivalent fractions (equal fractions). Two fractions can name the same amount even when the numbers look different. If you cut each part into the same number of smaller pieces, the fraction stays equal. Multiply the **top and bottom by the same number**. Example: $\frac{1}{2} = \frac{2}{4}$ (multiply top and bottom by 2).

Comparing fractions with the same bottom. When two fractions have the **same denominator** (the same size parts), the one with the **bigger top number** is bigger. Example: $\frac{3}{4} > \frac{1}{4}$ because 3 shaded parts is more than 1 shaded part.

Adding and subtracting fractions with the same bottom. When the bottom numbers are the same, the parts are already the same size. So you **add or subtract only the tops** (numerators) and **keep the bottom the same**. Example: $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$, and $\frac{4}{6} - \frac{1}{6} = \frac{3}{6}$.

Fractions and decimals (tenths and hundredths). A fraction with a bottom of **10** is written as a decimal in the **tenths** place. A fraction with a bottom of **100** is written in the **hundredths** place. Examples: $\frac{3}{10} = 0.3$ and $\frac{3}{100} = 0.03$.

Watch out: to add fractions you add only the tops — you never add the bottoms. And **0.3** (three tenths) is much bigger than **0.03** (three hundredths).

Worked Example — adding fractions with the same bottom

1. Add $\frac{2}{6} + \frac{3}{6}$. The bottoms are the **same** (both sixths), so the parts are already the same size.
2. **Add the tops:** $2 + 3 = 5$.
3. **Keep the bottom the same:** the bottom stays 6. So $\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$.

The picture below shows why: two sixths plus three sixths fills five of the six equal parts.

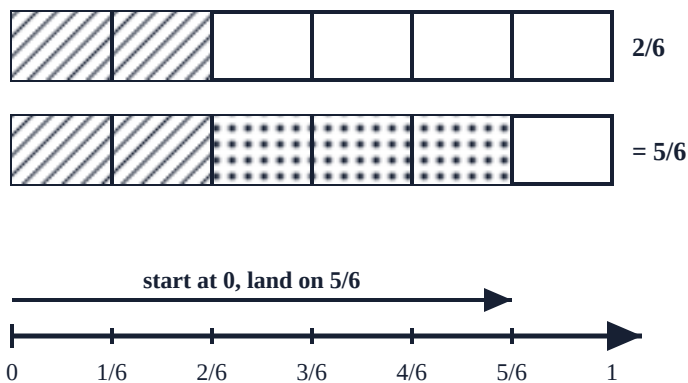


Figure 2. An area model and number line for $\frac{2}{6} + \frac{3}{6}$. The bottoms are the same, so you add only the tops ($2 + 3 = 5$) and keep the bottom (6), which gives $\frac{5}{6}$. The diagonal pattern shows the first fraction; the dotted pattern shows the second. Drawn in black so it reads clearly in grayscale.

3Using the worked example as your guide, add $\frac{1}{5} + \frac{3}{5}$. Add the tops and keep the bottom the same. Show each step.

4 Fill in the missing number to make an **equal fraction**: $\frac{1}{2} = \frac{?}{4}$. Explain how you knew.

Apply Use What You Know 20–25 min

Show the steps you use in every item. A basic calculator is allowed.

5 **Compare two fractions.** Write $<$, $>$, or $=$ between these two numbers, then tell in one sentence how you knew: $\frac{2}{8} \square \frac{5}{8}$. (Both are eighths — the same size parts.)

6 **Ribbon (story problem).** Ana has a ribbon that is $\frac{7}{8}$ of a meter long. She cuts off $\frac{3}{8}$ of a meter to tie a gift. How much ribbon is **left**? The bottoms are the same, so subtract the tops and keep the bottom. Show your steps.

7 **Match the fraction to its decimal.** Draw a line from each fraction to the decimal that names the same amount.

Fraction Decimal

$\frac{3}{10}$ 0.7

$\frac{7}{10}$ 0.03

$\frac{3}{100}$ 0.3

On the lines, write each fraction next to the decimal that equals it.

8 **Find and fix the error.** A student added two fractions this way. **Find the mistake, explain it, and give the correct answer** in the box.

Student's work:

$$\frac{2}{5} + \frac{1}{5} = (2 + 1) / (5 + 5) = \frac{3}{10}$$

What is wrong, and what is the correct sum?

Explain Justify Your Thinking 5–10 min

Question 9. In problem 8, a student wrote $\frac{2}{5} + \frac{1}{5} = \frac{3}{10}$. **Explain why you keep the bottom the same when the bottoms are equal.** Use the frame below: write your **Answer**, the **Model or numbers** you used, and **Why** your way is correct.

Sentence starters you may use: "The correct sum is ____ because..." · "The bottoms are both ____, so the parts are the same..." · "I add only the tops: ____ + ____ = ____..." · "You cannot add the bottoms because that would change..."

Answer (the correct sum)

Model or numbers I used

Why my way is correct

Close ACE Wrap-Up 5 min

Articulate

In your own words, explain what happens to the **bottom number** when you add two fractions that already have the same bottom.

Connect

Point to one item in this packet where you **added or subtracted** fractions with the same bottom. Give its number.

Extend

Write a fraction and its matching decimal that was **not** in this packet (a number of tenths or hundredths, like $\frac{6}{10} = 0.6$).

Continue Early Finisher optional · ~15 min

If you finish early (no new materials needed):

Draw your own model. On the back of this page, show the fraction $\frac{4}{6}$. **Draw an area model or a number line** like Figure 2 to show it. Split your bar into 6 equal parts and shade 4 of them. Label the parts, and write the fraction under your picture.

Turn in: Hand in this whole packet with your name, class period, and date filled in. Make sure questions 1–9 and the ACE box are answered **with your work shown**. The early-finisher challenge is optional, but turn it in too if you did it.

G04_MATH_FractionsDecimals_01 — Fractions and Decimals: Compare and Combine Student Packet



TEACHER ANSWER KEY FOLLOWS

Do not copy the pages after this divider for students.

Answer Key: Fractions and Decimals: Compare and Combine

Grade: 4 **Subject:** Mathematics **For teacher use only** Math

How to use this key

Answers are grouped by section and question number, with full worked steps. Accept any correct method that reaches the right value — a picture, a number line, or a decimal check are all fine where they apply. Watch-for notes flag common misconceptions. A basic calculator is allowed, so grade the **reasoning and steps**, not just the arithmetic. This is a Grade 4 packet, so every add/subtract uses the **same (like) denominator**. Estimated grading time: ~4–6 min per packet.

Start Warm-Up ~1 min

1 Name the shaded fraction of the bar.

3/4. The bar has 4 equal parts and 3 are shaded. Accept an equivalent that is clearly justified, but 3/4 is the intended reading. *Alternate:* a student who also writes 0.75 has connected 3/4 to its decimal — that is beyond the required answer, so give full credit as long as 3/4 is shown.

2 Which is bigger, 3/4 or 1/4?

3/4 is bigger. Both are fourths (same size parts), and 3 shaded parts is more than 1 shaded part, so $3/4 > 1/4$. Full credit for choosing 3/4 **and** a same-size-parts reason. *Watch-for:* a student who thinks the bottom "4" makes it big should be reminded that when the bottoms match, the bigger **top** wins.

Build Study the Math ~1 min

3 Add $1/5 + 3/5$.

Same bottom (fifths). Add the tops: $1 + 3 = 4$. Keep the bottom: 5. So $1/5 + 3/5 = 4/5$. *Alternate:* a number line from 0 to 1 in fifths landing on 4/5, or a bar of 5 parts with 4 shaded. As a decimal, $4/5 = 8/10 = 0.8$ (beyond the required answer — do not deduct if omitted).

4 Equal fraction: $1/2 = ?/4$.

$1/2 = 2/4$. Multiply top and bottom by 2 ($1 \times 2 = 2$, $2 \times 2 = 4$). The missing number is **2**. *Alternate:* a picture — cut a half-bar into two equal pieces and you see 2 of 4 parts. Full credit for 2 with any correct reason.

Apply Use What You Know ~2–3 min

5 Compare 2/8 and 5/8.

$2/8 < 5/8$. Both are eighths (same size parts), so compare the tops: $2 < 5$, so $2/8 < 5/8$. Full credit for the correct symbol **and** a same-bottom reason. *Watch-for:* the $</>$ symbol pointed the wrong way — the small end points to

the smaller number, $2/8$.

6 Ribbon: $7/8$ m – $3/8$ m cut off.

Same bottom (eighths). Subtract the tops: $7 - 3 = 4$. Keep the bottom: 8. So $7/8 - 3/8 = 4/8$ of a meter is left. *Alternate:* $4/8$ also equals $1/2$ — accept either $4/8$ or the simplified $1/2$. *Note:* simplifying is not required in Grade 4, so do not deduct for leaving $4/8$.

7 Match fraction to decimal.

$3/10 = 0.3$ (three tenths); $7/10 = 0.7$ (seven tenths); $3/100 = 0.03$ (three hundredths).

Watch-for: a student who matches $3/100$ to 0.3 has misread the place value — $3/100$ is three **hundredths**, written 0.03. Full credit for all three correct matches.

8 Error analysis: $2/5 + 1/5 = 3/10$ (student added the bottoms).

The mistake: The student **added the denominators** ($5 + 5 = 10$). When the bottoms are already the same, you do **not** add them — the bottom tells the **size** of the parts, and that size does not change. You add only the tops and keep the bottom.

Correct work: Same bottom (fifths). Add the tops: $2 + 1 = 3$. Keep the bottom: 5. So $2/5 + 1/5 = 3/5$.

Sanity check: $3/10$ (the student's answer) is smaller than $2/5$ alone, which cannot be right when you add a positive amount. Full credit requires (1) naming the "added the bottoms" error and (2) the correct $3/5$.

Explain Justify Your Thinking (Q9) ~1–2 min

9 Why keep the bottom the same ($2/5 + 1/5$).

Model answer. Answer: the correct sum is $3/5$. Model or numbers: the bottoms are both 5, so the parts are the same size; add the tops $2 + 1 = 3$ and keep the bottom 5. Why: The denominator names the **size** of each part (fifths). Both fractions are already fifths, so joining them just counts how many fifths there are in all — the size of a fifth does not change. Adding the bottoms would change the parts to tenths, which is why $3/10$ is wrong. Full credit requires the correct sum ($3/5$) and a reason that the bottom stays the same because the parts are already the same size.

Justification scoring rubric (3 points)

Score	Answer	Model or numbers used	Why (reasoning)
3	Correct sum $3/5$.	Shows the bottoms are the same and adds the tops ($2 + 1 = 3$, keep 5).	Clearly explains the bottom stays the same because the parts are already the same size.
2	Correct sum $3/5$.	Some work shown, or a minor slip.	Reasoning present but incomplete (e.g., "keep the bottom" without saying why).
1	Answer attempted, may be incorrect.	Little or no work shown.	Weak or missing reasoning.
0	No/incorrect answer.	No work.	No reasoning.

Close ACE ~1 min

ACE Articulate / Connect / Extend.

Articulate: Accept any plain-language version of: "the bottom number stays the same; you add only the tops."

Connect: Valid items where a like-denominator add/subtract happened include Q3, Q6, or Q8 (and the worked example). Any correctly named item earns credit.

Extend: Any correct fraction–decimal pair not in the packet — e.g., $1/10 = 0.1$, $6/10 = 0.6$, $9/10 = 0.9$, $25/100 = 0.25$, $50/100 = 0.5$. More than one answer is defensible; check the pair is truly equal (tenths → one decimal place, hundredths → two decimal places).

Challenge Early Finisher (optional)

EF Draw a model for $4/6$.

A correct area model shows a bar split into **6 equal parts** with **4 shaded**, labeled $4/6$; or a number line from 0 to 1 in sixths with a point/jump at $4/6$. Full credit for a labeled model that clearly shows 4 of 6 equal parts.

Alternate: a student who notices $4/6 = 2/3$ (each pair of sixths grouped) has gone beyond the task — accept it if the picture still shows 4 of 6 parts.

Watch Common misconceptions

- **Adding the denominators.** The Q8 error: $2/5 + 1/5 = 3/10$. Students add both tops and both bottoms. Reinforce that with a like denominator you add only the tops and **keep the bottom** — the size of the part does not change. A quick sanity check helps: the sum must be bigger than $2/5$, but $3/10$ is smaller.
- **Bigger denominator = bigger fraction.** In Q2 and Q5, some students think a bigger bottom number means a bigger fraction, or compare only the bottoms. When the bottoms match, the bigger **top** wins ($3/4 > 1/4$; $5/8 > 2/8$). A quick bar picture makes the same-size parts visible.
- **0.3 vs 0.03.** In Q7, students may match $3/100$ to 0.3. Three tenths ($3/10 = 0.3$) is ten times larger than three hundredths ($3/100 = 0.03$). Anchor the place-value names: tenths fill one decimal place, hundredths fill two.
- **Forgetting the fraction is "how many equal parts are shaded."** In Q1, a student who writes $3/1$ or counts only shaded-vs-unshaded ($3/1$ or 3 to 1) needs the reminder that the bottom is the **total** equal parts (4) and the top is the shaded parts (3).

Teacher follow-up based on likely errors

If many students miss Q8, do a quick 5-minute bar picture of $2/5 + 1/5$ so they see the parts stay the same size and you just count more fifths. If Q2 or Q5 show "bigger bottom = bigger," compare two same-bottom bars side by side and count shaded parts. If Q7 shows 0.3/0.03 mix-ups, practice reading tenths and hundredths aloud with a place-value chart. The Q9 justifications reveal who understands *why* the bottom stays the same — a good discussion starter next class. The separate student packet has all methods printed; this key is for the teacher only.

G04_MATH_FractionsDecimals_01 — Fractions and Decimals: Compare and Combine Teacher Answer Key