

Substitute Guide: Fractions and Decimals in Everyday Problems

Grade: 5 **Subject:** Mathematics **Time:** ~45 min core + ~15 min extension Math

Learning goal (plain language)

Students practice **comparing decimals**, **adding and subtracting fractions** that have different bottom numbers, and **connecting a fraction to its decimal**. **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 §111.7 (Grade 5 Mathematics). Number and operations — decimals and fractions.

- **Decimals:** compare and order decimals to the thousandths using place value.
- **Fractions:** add and subtract fractions with unlike denominators using equivalent fractions (a common denominator).
- **Connections:** relate a fraction to its decimal form.

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.)

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 (compare decimals, name a fraction)

Segment	Time	What students do
Build — Study the math	5–10 min	Read reference box, worked example, area model; Q3
Apply — Use what you know	20–25 min	Q4–Q7 (recipe, money, error analysis, choose the operation)
Explain — Justify (Answer/Numbers/Why)	5–10 min	Q8 short explanation
Close — ACE	5 min	Articulate / Connect / Extend
Continue — early finishers	optional ~15 min	Draw a model for $1/3 + 1/6$

Script Read aloud to start

"Today's assignment is a paper math packet called *Fractions and Decimals in Everyday Problems*. 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, prompt with "What does the worked example do first?" or "Can you make the bottom numbers match?" rather than giving the answer.
- For decimals, remind them to line up by place value and add zeros so both numbers have the same number of decimal places.
- 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 **steps** in the reference box, the **area model**, and the **sentence starters** for Q8 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 Q8 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 (Q6)** and the **justification (Q8)**, which reveal the "add the denominators" misconception and whether students understand *why* a common denominator is needed. Watch for **lining up decimals by digits instead of place value** in Q1 and Q5, and the **$\frac{1}{2} = 0.2$** slip. The choose-the-operation item (Q7) shows who reads for key words like "in all." The separate answer key lists worked steps, alternate strategies, common misconceptions, and a 3-point rubric for Q8.

G05_MATH_FractionsDecimals_01 — Fractions and Decimals in Everyday Problems Substitute Guide

Fractions and Decimals in Everyday Problems

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

Start Warm-Up 5 min

Bring back what you already know about decimals and fractions.

1Compare two decimals. Write $<$, $>$, or $=$ between these two numbers, then tell in one sentence how you knew:
 $0.7 \square 0.68$.

2Name 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.

Build Study the Math 5–10 min

What you need to know

Comparing decimals (to thousandths). Line up numbers by **place value**, not by how many digits they have. Compare left to right: **tenths**, then **hundredths**, then **thousandths**. It helps to add zeros so both numbers have the same number of decimal places. Example: to compare 0.7 and 0.68, write 0.7 as **0.70**. Now 0.70 vs 0.68 → 7 tenths beats 6 tenths, so **0.70 > 0.68**.

Adding & subtracting fractions with unlike denominators. You can only add or subtract fractions when the parts are the **same size** — that means the same denominator (the bottom number). Steps:

1. Find a **common denominator** (a number both bottoms divide into). Multiplying the two bottoms always works.
2. Rename each fraction as an **equal fraction** with that common bottom (multiply the top and bottom by the same number).
3. Add or subtract only the **tops** (numerators). Keep the common bottom.

$$1/2 + 1/4 \rightarrow 2/4 + 1/4 = 3/4$$

Connecting a fraction to its decimal. A fraction is a division: the top divided by the bottom. If you can rename a fraction with a bottom of 10, 100, or 1000, you can read the decimal straight off. Examples: $1/2 = 5/10 = 0.5$, and $3/4 = 75/100 = 0.75$.

Watch out: $1/2$ is **0.5**, not 0.2. And when comparing decimals, 0.7 is bigger than 0.68 even though 0.68 has more digits.

Worked Example — adding fractions with unlike denominators

Add $1/2 + 1/3$. The bottoms are different (2 and 3), so the parts are different sizes. First find a common bottom.

Step 1 — common denominator: $2 \times 3 = 6$. Sixths work for both.

Step 2 — rename each fraction: $1/2 = 3/6$ (multiply top and bottom by 3), and $1/3 = 2/6$ (multiply top and bottom by 2).

Step 3 — add the tops: $3/6 + 2/6 = 5/6$. The picture below shows why: three sixths plus two sixths fills five of the six equal parts.

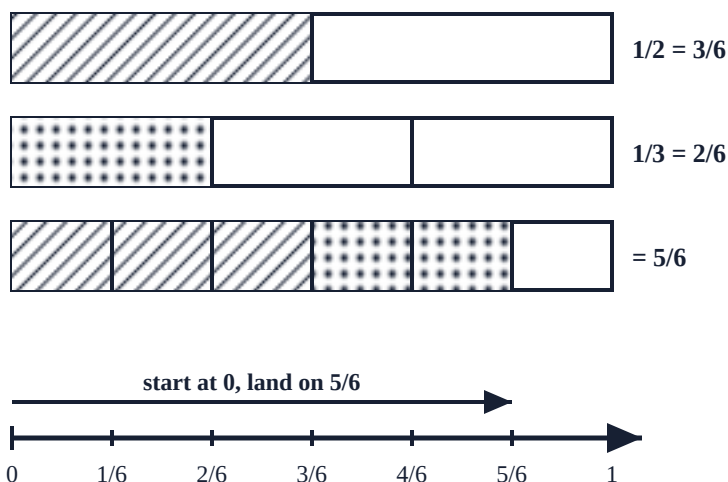


Figure 2. An area model and number line for $1/2 + 1/3$. Renaming both fractions into **sixths** ($3/6$ and $2/6$) makes the parts the same size, so they add to $5/6$. The diagonal pattern shows the half; the dotted pattern shows the third. Drawn in black so it reads clearly in grayscale.

3Using the worked example as your guide, add $\frac{1}{2} + \frac{1}{4}$. Rename to a common denominator first, then add the tops. Show each step.

Apply Use What You Know 20–25 min

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

4**Recipe (adding fractions)**. A snack recipe uses $\frac{1}{2}$ cup of raisins and $\frac{1}{3}$ cup of almonds. How many cups of raisins and almonds are there **in all**? Find a common denominator, rename, and add. Show your steps.

5**Money (decimals)**. Maya buys a notebook for \$3.45 and a pen for \$1.60.

5a. How much does she spend in all? Line up the decimal points and add.

5b. She pays with a \$10.00 bill. How much change does she get back? Show your subtraction.

6**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:

$$\frac{1}{4} + \frac{1}{2} = (1 + 1) / (4 + 2) = \frac{2}{6}$$

What is wrong, and what is the correct sum?

7Which operation? (multi-step). A water bottle holds **2 liters**. José drinks **3/4 liter** in the morning and **1/2 liter** at lunch.

7a. How much has José drunk **in all**? Decide the operation, then find a common denominator and add. Show your steps.

7b. One tip for choosing the operation: "in all" usually means add; "how much is left" usually means subtract. In one sentence, tell which words in part 7a told you to add.

Explain Justify Your Thinking 5–10 min

Question 8. In problem 6, a student wrote $1/4 + 1/2 = 2/6$. **Explain why you cannot just add the tops and add the bottoms.** Use the frame below: write your **Answer**, the **Numbers you used**, and **Why** your way is correct.

Sentence starters you may use: "The correct sum is ____ because..." · "First I found a common denominator by..." · "I renamed $1/4$ as ____ and $1/2$ as ____..." · "You cannot add the bottoms because the parts must be..."

Answer (the correct sum)

Numbers I used

Why my way is correct

Close ACE Wrap-Up 5 min

Articulate

In your own words, explain what a **common denominator** is and why you need one to add fractions.

Connect

Point to one item in this packet where you found a common denominator. Give its number.

Extend

Write a fraction and its matching decimal that was **not** in this packet (for example, a fraction equal to a number of tenths or hundredths).

Continue Early Finisher optional · ~15 min

If you finish early (no new materials needed):

Draw your own model. On the back of this page, add $1/3 + 1/6$. First find a common denominator, then **draw an area model or a number line** like Figure 2 to show the sum. Label the parts, and write the final answer as a fraction. If you can, also write it as a decimal.

Turn in: Hand in this whole packet with your name, class period, and date filled in. Make sure questions 1–8 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.



TEACHER ANSWER KEY FOLLOWS

Do not copy the pages after this divider for students.

Answer Key: Fractions and Decimals in Everyday Problems

Grade: 5 **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 — alternate strategies (a larger common denominator, a picture, or a decimal check) are noted where they apply. Watch-for notes flag common misconceptions. A basic calculator is allowed, so grade the **reasoning and steps**, not just the arithmetic. Estimated grading time: ~4–6 min per packet.

Start Warm-Up ~1 min

1 Compare 0.7 and 0.68.

0.7 > 0.68. Line up by place value: write 0.7 as 0.70, then compare tenths first — 7 tenths > 6 tenths, so $0.70 > 0.68$. Full credit for the correct symbol **and** a place-value reason. *Watch-for:* students who say 0.68 is bigger "because it has more digits" have the length-vs-place-value misconception.

2 Name the shaded fraction of the bar.

3/5. The bar has 5 equal parts and 3 are shaded. Accept an equivalent that is clearly justified, but 3/5 is the intended reading. *Alternate:* a student who writes 0.6 has also correctly connected 3/5 to its decimal — give full credit if the fraction reasoning is shown.

Build Study the Math ~1 min

3 Add $1/2 + 1/4$.

Common denominator: 4 (since 2 divides into 4). Rename $1/2 = 2/4$. Then $2/4 + 1/4 = 3/4$. *Alternate:* using $2 \times 4 = 8$ gives $4/8 + 2/8 = 6/8$, which simplifies to $3/4$ — accept either the 4ths or the 8ths form. As a decimal, $3/4 = 0.75$.

Apply Use What You Know ~2–3 min

4 Recipe: $1/2$ cup raisins + $1/3$ cup almonds.

Common denominator: 6. Rename $1/2 = 3/6$ and $1/3 = 2/6$. Add the tops: $3/6 + 2/6 = 5/6$ **cup** in all. *Alternate:* any common multiple of 2 and 3 (such as 12: $6/12 + 4/12 = 10/12 = 5/6$) is fine. This mirrors the worked example, so many students can reuse those steps.

5 Money: notebook \$3.45, pen \$1.60, pays with \$10.00.

5a. $\$3.45 + \$1.60 = \$5.05$ (line up the decimal points: 45 hundredths + 60 hundredths = 105 hundredths = \$1.05, carry the dollar).

5b. $\$10.00 - \$5.05 = \$4.95$ change.

Watch-for: a student who writes $\$3.45 + \1.6 and lines up the last digits (getting $\$3.51$ or similar) has lined up by digits, not place value. Remind them $\$1.60 = \1.60 .

6 Error analysis: $1/4 + 1/2 = 2/6$ (student added tops and bottoms).

The mistake: The student **added the denominators** ($4 + 2 = 6$). You cannot add the bottoms — the bottom tells the **size** of the parts, and you must make the parts the same size first with a common denominator.

Correct work: Common denominator 4. Rename $1/2 = 2/4$. Then $1/4 + 2/4 = 3/4$.

Sanity check: $1/2$ alone is already $2/4$, so the sum must be more than $1/2$ — but the student's $2/6 (= 1/3)$ is *less* than $1/2$, which shows the answer cannot be right. Full credit requires (1) naming the "added the denominators" error and (2) the correct $3/4$.

7 Which operation: $3/4$ L + $1/2$ L drunk from a 2 L bottle.

7a. "In all" → **add**. Common denominator 4. Rename $1/2 = 2/4$. Then $3/4 + 2/4 = 5/4 = 1 \frac{1}{4}$ **liters** (one and one-quarter liters). Accept the improper form $5/4$ or the mixed number $1 \frac{1}{4}$.

7b. The phrase "**in all**" (combining both amounts) tells you to add. Accept any answer that points to "in all" or the idea of joining the two amounts.

Note: The 2-liter capacity is extra information; some students may check that $1 \frac{1}{4}$ L is less than 2 L, which is good reasoning.

Explain Justify Your Thinking (Q8) ~1–2 min

8 Why you cannot add tops and bottoms ($1/4 + 1/2$).

Model answer. Answer: the correct sum is $3/4$. Numbers I used: common denominator 4; $1/2$ renamed as $2/4$; $1/4 + 2/4 = 3/4$. Why: The denominator names the **size** of each part. Fourths and halves are different sizes, so you cannot combine them until you rename them as the same-size parts (fourths). Adding the bottoms would change the size of the parts, which is why $2/6$ is wrong. Full credit requires the correct sum ($3/4$) and a reason that fractions must have the same-size parts (a common denominator) before adding.

Justification scoring rubric (3 points)

Score	Answer	Numbers used	Why (reasoning)
3	Correct sum $3/4$.	Shows common denominator 4 and the rename $1/2 = 2/4$.	Clearly explains that parts must be the same size, so you cannot add the denominators.
2	Correct sum $3/4$.	Some renaming shown, or a minor slip.	Reasoning present but incomplete (e.g., says "make bottoms match" 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: "a common denominator is a shared bottom number so the parts are the same size; you need it so the fractions can be combined."

Connect: Valid items where a common denominator was found include Q3, Q4, Q6, or Q7a. Any correctly named item earns credit.

Extend: Any correct fraction–decimal pair not in the packet — e.g., $1/5 = 2/10 = 0.2$, $1/4 = 25/100 = 0.25$, $3/10 = 0.3$, $1/10 = 0.1$. More than one answer is defensible; check the pair is truly equal.

Challenge Early Finisher (optional)

EF Draw a model for $\frac{1}{3} + \frac{1}{6}$.

Common denominator: 6. Rename $\frac{1}{3} = \frac{2}{6}$; $\frac{1}{6}$ stays $\frac{1}{6}$. Then $\frac{2}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$. A correct area model shows a bar in sixths with 3 of 6 parts shaded, or a number line from 0 to 1 in sixths with a jump ending at $\frac{3}{6}$. As a decimal, $\frac{1}{2} = 0.5$. Full credit for a labeled model that matches $\frac{3}{6}$ (or the simplified $\frac{1}{2}$). Accept the unsimplified $\frac{3}{6}$.

Watch Common misconceptions

- **Adding the denominators.** The Q6 error: $\frac{1}{4} + \frac{1}{2} = \frac{2}{6}$. Students add both tops and both bottoms. Reinforce that only the tops are added, and only after the bottoms match (same-size parts). A quick sanity check helps: the sum must be bigger than $\frac{1}{2}$, but $\frac{2}{6}$ is smaller.
- **Lining up decimals by digits, not place value.** In Q5, \$1.60 must line up as 1.60, not "1.6" pushed to the right. Comparing 0.7 and 0.68 (Q1) trips students who think "more digits = larger." Rewrite with matching decimal places (0.70 vs 0.68).
- **$\frac{1}{2}$ vs 0.2.** Students may write $\frac{1}{2} = 0.2$. Model that $\frac{1}{2} = \frac{5}{10} = 0.5$ (one half of ten tenths is five tenths). 0.2 is $\frac{2}{10} = \frac{1}{5}$.
- **Forgetting to rename before adding.** Some find a common denominator but forget to change the numerators too (e.g., leaving $\frac{1}{2}$ as $\frac{1}{6}$ instead of $\frac{2}{6}$). Both top and bottom multiply by the same number.
- **Choosing the wrong operation.** In Q7, "in all" signals addition; watch for students who subtract. Anchor the key words ("in all," "left," "how much more").

Teacher follow-up based on likely errors

If many students miss Q6, do a quick 5-minute picture of $\frac{1}{4} + \frac{1}{2}$ with an area model so they see the parts must match before adding. If Q1 or Q5 show digit-lining, practice writing decimals with equal places (0.70, 1.60) and comparing tenths first. If Q3/Q4 show a missing rename, model multiplying top *and* bottom by the same number. The Q8 justifications reveal who understands *why* a common denominator is needed — a good discussion starter next class. The separate student packet has all methods printed; this key is for the teacher only.