Dividing Fractions: Teacher Guide and Answer Key

Do not include this section in student files. Plan roughly 10–15 minutes per practice page and 5–8 minutes for the independent recheck. These are planning estimates; the materials have not been classroom-tested. Offer large print, a spoken version of the diagrams, a student's usual response method, or manipulatives. Keep the same mathematical demand: students must indicate what counts as one group or one full batch.

Why the reciprocal method works

Rename both amounts with the same-sized pieces. In A2, each full jar holds four twelfths of a liter, and you have seven twelfths. The question becomes "How many groups of four of those pieces fit in seven pieces?" It is 7 ÷ 4. For positive fractions in general, a/b and c/d can be renamed as ad/(bd) and bc/(bd). With the unit pieces now the same size, divide the counts: ad ÷ bc. This is the same as multiplying a/b by d/c. Make the unit visible first; use the computation shortcut afterward.

Page A

1. **6 loops.** Three quarters is six eighths. Each eighth makes one loop: 3/4 ÷ 1/8 = 6. Check: 6 × 1/8 = 3/4 yard.
2. **1 3/4 jarfuls; 1 full jar; 1/4 liter left.** The first jump ends at 4/12. There are 3/12 liter left, which is three quarters of a 4/12-liter jar. Check: 1 3/4 × 1/3 = 7/12 liter.
3. **3/4 of one tray.** A tray needs 2/5 = 4/10 kilogram, and the team has three of those four tenths. Three pieces cannot fill a tray that needs four pieces. Check: 3/4 × 2/5 = 3/10 kilogram.

Page B

1. **3 full sets; 1/12 liter left; 3 1/3 sets' worth altogether.** Use twelfths: 5/6 = 10/12 and 1/4 = 3/12. Three full groups use 9/12 liter; the extra 1/12 liter is one third of a 3/12-liter group.
2. **4/5 kilogram for one batch.** 3/5 ÷ 3/4 = 4/5. A quarter-batch uses (3/5) ÷ 3 = 1/5 kilogram; four quarters use 4/5 kilogram. Check: (3/4) × (4/5) = 3/5 kilogram.
3. **5/6 of a full label's length.** The class has five eighths; a full label needs six eighths, so 5/8 ÷ 6/8 = 5/6. The available strip is shorter than one label.
4. **7/6 or 1 1/6, greater than 1.** 2/3 = 6/9, so 7/9 ÷ 6/9 = 7/6. Check: 7/6 × 2/3 = 7/9.
5. **2/3, less than 1.** Four seventh-sized pieces make four sixths of a six-piece group. Check: 2/3 × 6/7 = 4/7.
6. **1, equal to 1.** One group of size 3/5 fits in 3/5. Check: 1 × 3/5 = 3/5.

Page C

1. **2 1/2.** In sixths, one group needs 2 pieces and 5 pieces are available. Multiplying by 1/3 would find one third of 5/6 instead. Check: 5/2 × 1/3 = 5/6.

2. **2/3.** The available half is 2 fourths. A group takes 3 fourths. Turning over the first fraction instead of the divisor does not preserve this question. Check: 2/3 × 3/4 = 1/2.
3. **The quotient is right; the unit claim is wrong.** Three kits use 3/5 = 6/10 meter, leaving 1/10 meter. This is half of a 1/5-meter group, so the fractional part is **half a kit's worth**, not half a meter.
4. **1/2 of one group.** For example, a full packet holds 4/5 cup and there is 2/5 cup available, enough for half a packet. Accept different sensible contexts that keep the available amount and group size in the same unit. Check: 1/2 × 4/5 = 2/5.

Page D

1. **1 5/6 crafts' worth; 5/16 meter left.** One full craft needs 6/16 meter; 11 − 6 = 5 sixteenths remain. The leftover makes 5/6 of a craft because it supplies five of the six pieces needed. "Crafts' worth" counts groups; "meters" measures the cord. Check: (11/6) × (3/8) = 11/16 meter.
2. **5/8 meter.** One third of a banner uses half of 5/12, or 5/24 meter. Three thirds use 15/24 = 5/8 meter. Check: (2/3) × (5/8) = 5/12 meter.

Choose the next teaching move

- **Correct calculation, wrong unit:** Compare the answer to C3 with the actual length of the leftover. Label one meter, one kit-length, and the leftover as three different things.
- **Stops when no full group fits:** Use A3 to mark all four tenths needed, then compare the three available pieces with that four-piece group.
- **Reverses the divisor and dividend:** Read the story aloud, label the known amount and the size of one group, then test the proposed quotient by multiplication.
- **Models and labels the answer:** Ask the student to explain when a quotient exceeds the original number and why that does not mean the physical amount grew.

Give Page D after the teaching move, without displaying its answers or rehearsing its exact problems first. Treat the two tasks as a small sample, not a placement decision. Look for group units in D1 and per-full-banner reasoning or a valid inverse check in D2.