

Accelerated 6 • Unit 3 • Assessment Guide

Fractions and Decimals

For the Parent or Teacher — What to look for

Unit 3 deepens what 'division' means when fractions and decimals are involved. The big idea: $\div$ by a number <1 makes the answer BIGGER. Watch for students who can compute but can't say what the computation MEANS.

Part A — Quick Computations

- $\frac{3}{4} \div \frac{1}{2} = 1.5$. $1.4 \cdot 0.5 = 0.7$. $6 \div \frac{1}{4} = 24$. $2.4 \div 0.6 = 4$.
- If they pause on $\frac{3}{4} \div \frac{1}{2}$, they may not have internalized that dividing by $\frac{1}{2}$ doubles.
- If they say $6 \div \frac{1}{4} = 1.5$ (off by a factor of 16), they're inverting the wrong number — a serious gap.

Problem 1 — Predict size of quotient (no computation)

- ★ KEY diagnostic for Unit 3.
- (a) $3 \div \frac{1}{2} = 6 \rightarrow >1$. (b) $\frac{1}{2} \div 3 = \frac{1}{6} \rightarrow <1$. (c) $\frac{3}{4} \div \frac{3}{4} = 1 \rightarrow =1$. (d) $0.4 \div 0.8 = 0.5 \rightarrow <1$.
- Strong reasoning: 'dividing by a number less than 1 makes the result bigger; by a number greater than 1, smaller.'
- Weak: gets values right by computing but explanation is just 'I did the division' — no qualitative reasoning.

Problem 2 — Two interpretations of $\div$

- BOTH interpretations are correct (this is the answer).
- Lin = 'how many groups of $\frac{1}{3}$ fit in 4?' (measurement division).
- Sara = 'if 4 is $\frac{1}{3}$ of something, find the whole' (partitive division).
- Both yield 12.
- ★ Strong: marks 'Both' and shows 12 via BOTH interpretations.
- Weak: picks one, says the other is wrong — common misconception that division has only one meaning.

Problem 3 — $2.4 \div 0.6$ three ways

- Way 1: $24/10 \div 6/10 = 24/6 = 4$.
- Way 2: $\cdot 10$ both: $24 \div 6 = 4$.
- Way 3: 'how many 0.6's fit in 2.4?' $\rightarrow 4$.
- Strong: three DIFFERENT strategies, all yielding 4, with reasoning.
- Weak: same strategy three times in different handwriting (long division thrice).

Problem 4 — Why $0.7 \times 0.8 \neq 5.6$

- Correct: 0.56.
- ★ Diagnostic: estimation. Both factors are <1 , so the product MUST be less than the smaller factor.
- Strong: 'both numbers are less than 1, so the product must be less than either of them.' Notes the place-value rule for decimal multiplication.
- Weak: just computes 0.56 without addressing WHY Han's error is implausible.

Problem 5 — Decimals vs. fractions for $1.25 + 0.375 + 0.0625$

- Decimal sum: 1.6875 . Fraction: $1\frac{1}{4} + \frac{3}{8} + \frac{1}{16} = \frac{20}{16} + \frac{6}{16} + \frac{1}{16} = \frac{27}{16} = 1.6875$.
- Both should yield the same answer; this confirms equivalence.
- Strong: notices that all three are powers of 2 in the denominator (16ths) — fractions are clean.
- Weak: gets different answers in the two methods (suggests a conversion error).

Problem 6 — $\frac{2}{3} \times 1\frac{3}{4}$ rectangle area

- $\frac{2}{3} \times \frac{7}{4} = \frac{14}{12} = \frac{7}{6} = 1\frac{1}{6} \text{ m}^2$.
- Decimal: $0.6667 \times 1.75 \approx 1.1667 \approx \frac{7}{6}$.
- Strong: gets matching fraction and decimal, uses one to verify the other.
- Weak: decimal answer is 1.16 (truncated, doesn't recognize it's repeating), and doesn't notice the slight 'mismatch.'

Problem 7 — Box volume + how many in 1 m^3

- Box volume: $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4} = \frac{1}{24} \text{ m}^3$.
- Number of boxes in 1 m^3 : 24.
- ★ The ELEGANT connection: $\frac{1}{24} \leftrightarrow 24$. Reciprocal relationship.
- Strong: sees that 'how many fit' = $1 \div (\text{volume of one})$ — connects multiplication and division.
- Weak: gets $\frac{1}{24}$ but adds the dimensions for the second part, or doesn't see the reciprocal.

Problem 8 — Maya's 'division makes smaller' claim

- Maya is WRONG.
- Supports Maya: $6 \div 2 = 3$ (yes, smaller).
- Counters Maya: $6 \div \frac{1}{2} = 12$ (bigger). $6 \div 1 = 6$ (same). $6 \div 0.5 = 12$ (bigger).
- Strong: recognizes that the size of the divisor relative to 1 determines whether the result grows or shrinks.
- Weak: gives only one counter, can't articulate the rule.

Problem 9 — Glasses from a pitcher (with remainder)

- $1\frac{3}{4} \div \frac{2}{5} = \frac{7}{4} \div \frac{2}{5} = \frac{7}{4} \times \frac{5}{2} = \frac{35}{8} = 4.375$.
- 4 full glasses, with 0.375 of a glass left = 0.15 L of liquid.
- ★ Strong: explains that the 0.375 in the quotient is fraction of A GLASS, not fraction of a liter — interpreting the remainder.
- Weak: says 'remainder is 0.375 liters' (wrong unit). This is the SAME structural confusion as long-division remainders, applied to fractions.

Problem 10 — Write 3 different division stories

- (a) $8 \div \frac{1}{4}$: 'I have 8 cups of yogurt and each serving is $\frac{1}{4}$ cup. How many servings?' (measurement)
- (b) $\frac{1}{4} \div 8$: 'I have $\frac{1}{4}$ liter of paint to share equally among 8 people. How much each?' (partitive)
- (c) $\frac{3}{4} \div \frac{1}{4}$: 'I have $\frac{3}{4}$ pound of cheese; each sandwich uses $\frac{1}{4}$ pound. How many sandwiches?' (measurement)
- ★ Strong: stories distinguish measurement from partitive division.
- Weak: all three stories are the same TYPE; or stories don't actually match the operation (a common error).