

Grade 5 • Unit 5 • Assessment Guide

Place Value Patterns and Decimal Operations

For the Parent or Teacher — What to look for

Unit 5 extends place value into decimals (to thousandths) and develops the four operations on decimals. The diagnostic is whether the student understands that the same place-value rules from whole numbers extend to decimal places — multiplying and dividing by powers of 10 just SHIFTS digits, and decimal operations follow the same logic as whole-number ones if you keep track of place value.

Problem 1 — Write 0.347 three ways

- Words: three hundred forty-seven thousandths.
- Expanded: $0.3 + 0.04 + 0.007$.
- Fraction: $347/1000$.
- ★ Strong: all three correct; weak: writes 'point three four seven' or fraction $347/100$.

Problem 2 — Place values in 7.625

- $6 = 6 \text{ tenths} = 0.6$. $2 = 2 \text{ hundredths} = 0.02$. $5 = 5 \text{ thousandths} = 0.005$.
- The 6 is $10 \times 10 = 100$ times as much as the 5 (going from thousandths to tenths is two places left = $\times 100$).
- ★ THE key understanding of Unit 5: each place is 10x the place to its right.
- Weak: just says '6' for value of 6; doesn't connect to place value.

Problem 3 — Locate 0.625 on number line

- 0.625 is between 0.6 and 0.7, closer to 0.6 (since $0.625 = 0.6 + 0.025$).
- Strong: '0.625 is between 0.6 and 0.7. Since it is 0.625, it is a quarter of the way from 0.6 to 0.7.'
- Weak: puts it at 0.5 or just past 0.5 (misreads tenths as hundredths).

Problem 4 — Compare decimals

- $0.5 = 0.50$ (same!). $0.4 > 0.39$. $0.07 < 0.7$.
- ★ The 0.4 vs 0.39 comparison is the diagnostic: more digits $\neq$ bigger. Some students think $0.39 > 0.4$ because $39 > 4$.
- Strong: ' $0.4 = 0.40$, and $0.40 > 0.39$ because 40 hundredths $>$ 39 hundredths.'
- Weak: '0.39 is bigger because there are more digits.'

Problem 5 — Round 7.286

- (a) 7. (b) 7.3. (c) 7.29.
- For tenths: looks at the hundredths digit ($8 \geq 5$, so round UP).
- ★ Strong: articulates that we look at the NEXT digit after the rounding place.
- Weak: rounds $7.286 \rightarrow 7.2$ because '8 is even' or some other irrelevant reasoning.

Problem 6 — Order decimals

- Correct order: 0.08, 0.4, 0.404, 0.408, 0.43.
- ★ Many trip points: $0.4 = 0.400$ (less than 0.404). $0.43 = 0.430$ (greater than 0.408).
- Strong: rewrites all with same number of decimal places to compare.
- Weak: orders by 'number of digits' (puts 0.08 last because '08' is small).

Problem 7 — Add/subtract decimals

- (a) 4.07. (b) 6.13. (c) 17.82.
- Watch for alignment errors — especially (a) where the addends have different decimal places.
- Strong: lines up by decimal point, gets all three.

Problem 8 — Mai's misalignment

- Mai is WRONG. She aligned to the right (6 under 7), treating it like whole numbers.
- Correct: align by the DECIMAL POINT. $3.47 + 0.60 = 4.07$.
- ★ THE classic decimal-addition error. The student catching this is the diagnostic.
- Strong: shows correct alignment and gets 4.07.

Problem 9 — 0.3×0.4 with grid

- Answer: 0.12. The rectangle is 0.3 wide x 0.4 tall; the area is 12 hundredths.
- ★ The answer is SMALLER than both factors (because both factors are < 1).
- Strong: 'When I multiply by a number less than 1, I am taking only part of the first number, so the result is smaller.'
- Weak: writes 0.12 from a rule without understanding why it is smaller.

Problem 10 — Decimal products

- (a) 3.5 (b) 0.60 (or 0.6) (c) 3.6.
- Strong: uses place value or whole-number facts ($15 \times 4 = 60$, then $1.5 \times 0.4 = 60$ hundredths $= 0.6$).
- Weak: just moves decimal places without understanding.

Problem 11 — Decimal division

- (a) 80. (How many tenths in 8? Each whole has 10 tenths, so 8 wholes have 80 tenths.)
- (b) 0.2. (Split 6 tenths into 3 equal groups; each is 2 tenths.)
- (c) 4. (How many halves in 2? 4.)
- ★ Strong: explains each in words. (a) and (c) BOTH have answers BIGGER than the dividend — division by a number less than 1 makes things bigger.

Problem 12 — Why $\times 10$ moves decimal point

- Strong: 'Each place is 10x the place to its right. When we multiply by 10, every digit value becomes 10x more, so each digit moves to the next higher place — which looks like the decimal point moving right.'
- Weak: 'That is just the rule.' Reveals memorization without understanding.

Problem 13 — Han's addition vs multiplication

- $0.4 + 0.5 = 0.9$ ✓ correct.
- $0.4 \times 0.5 = 0.20$ (or 0.2) ✓ correct.
- ★ The point: addition just combines amounts; multiplication takes a fraction of a fraction.
- Strong: 'Addition adds the amounts together. Multiplication takes a piece of a piece — that is why 0.4×0.5 is way smaller than 0.4 alone.'