Grade 6 · Unit 7 · Assessment Guide

Rational Numbers

For the Parent or Teacher — What to look for

Unit 7 expands the number system to include negatives. The single most common Grade 6 error: treating magnitude as the same as order. Look for students who can DISTINGUISH order on the number line from absolute value.

Problem 1 — Ordering rational numbers

- (a) −7, −5, −1, 0, 3, 4.
- (b) −1.5, −1, −1/2, 1/4, 0.75. (Convert mentally to decimals: −1.5, −1, −0.5, 0.25, 0.75.)
- Strong: places negatives correctly (more negative = smaller).
- Weak: orders by absolute value (would put −1.5 last because |1.5|>|0.75|).
- ★ Most common Unit 7 mistake.

Problem 2 — Plot on number line

- Strong: tick marks reasonably spaced; decimals placed between integers (−2.5 between −3 and −2).
- Opposites: 1.5 and −1.5, OR (depending on the student's labeling) — they should identify a pair with the same absolute value and opposite signs.
- Weak: places −2.5 between −2 and 0 (treats negatives as moving away from −3 rather than toward 0).

Problem 3 — Absolute value

- (a) 8. (b) 3.5. (c) 2/3. (d) 0.
- Strong: realizes absolute value is the DISTANCE from zero, always non-negative.
- Weak: writes |0| as undefined; or writes |−8| = −8.
- ★ |0| = 0 is the boundary case — students who get every other one right but stumble here are still building the definition.

Problem 4 — T/F with negatives

- (a) FALSE. −5 is LESS than −3.
- (b) TRUE. |−5| = 5 > |−3| = 3.
- (c) FALSE. Absolute value is distance from 0; sign matters for ORDER. (−10 has larger absolute value than 5 but is LESS than 5.)
- ★ Distinguishing |x| vs x is the heart of Unit 7. (a) and (b) being opposite truth values is THE diagnostic.

Problem 5 — Write inequalities

- (a) m > 15. (b) w ≤ 4. (c) T < −3.
- Strong: distinguishes strict (<, >) from inclusive (≤, ≥).
- Weak: uses 'more than' as ≥ instead of >; flips direction of inequality.

Problem 6 — Solutions to x < 5

- (a) Solution. (b) NOT solution (5 is not < 5). (c) Solution. (d) Solution.
- Strong: 5 itself is correctly EXCLUDED.
- Weak: includes 5 because it 'feels close'.

- ★ The boundary (x=5) is the hardest case for sixth-graders.

Problem 7 — Plot 5 points

- A(3,4) Q1. B(−2,5) Q2. C(−3,−4) Q3. D(4,−1) Q4. E(0,−3) on the y-axis (between Q3 and Q4 — not in a quadrant).
- Strong: knows the quadrants by sign rules AND recognizes E is on the AXIS, not in a quadrant.
- Weak: confuses Q2 and Q4; places E in Q3 or Q4 (assigns axis points to a quadrant).

Problem 8 — Distance between (−4,3) and (5,3)

- Same y-coordinate. Horizontal distance = |−4| + |5| = 4 + 5 = 9 units.
- Strong: notices same y-coordinate → use horizontal distance; adds absolute values.
- Weak: subtracts 5 − (−4) = 9 correctly, OR gets 1 (subtracts 5 − 4); or uses the wrong coordinate.

Problem 9 — GCF and LCM

- (a) GCF(18, 24) = 6.
- (b) LCM(18, 24) = 72.
- (c) Need same total: LCM(8, 12) = 24. So 24 hot dogs (3 packs) and 24 buns (2 packs). This is an LCM problem.
- Strong: identifies the situation as LCM (matching totals) vs GCF (splitting into groups).
- Weak: confuses GCF and LCM; the contextual judgment in (c) is the diagnostic.

Problem 10 — Andre: −8 > −3?

- Andre is WRONG. On the number line, −8 is to the LEFT of −3, so −8 < −3.
- Strong: uses a number line; explains 'farther left = smaller, even though the magnitude is larger'.
- Weak: agrees because 8 > 3 (treats absolute value as the number).
- ★ The same misconception as Problem 4(c) tested differently.

Problem 11 — Original negative-number situation

- Strong: realistic context using negatives (elevation, temperature, money, etc.); two values; clear comparison.
- Weak: numbers don't actually use negatives; comparison doesn't make sense; no solution.

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