

Grade 6 • Unit 3 • Assessment Guide

Unit Rates and Percentages

For the Parent or Teacher — What to look for

Unit 3 builds on Unit 2 ratios. The critical extension is recognizing that EACH ratio has TWO unit rates and that percentages are rates per 100. Look for fluent movement among ratio, unit rate, and percentage representations.

Problem 1 — Markers (two unit rates)

- (a) $\$6.40 \div 8 = \0.80 per marker.
- (b) $8 \div 6.40 = 1.25$ markers per dollar.
- (c) For finding the cost of 15 markers, the 'cost per marker' (a) is easier. The 'markers per dollar' (b) would be more useful if asked 'how many markers for \$20'.
- ★ THIS IS THE CENTRAL UNIT 3 CONCEPT: each ratio has TWO unit rates, and which to use depends on the question.
- Strong: computes BOTH and explains which is more useful WHY.
- Weak: computes only one; uses 'price per marker' for everything.

Problem 2 — Comparing speeds

- Lin: $600/4 = 150$ m/min.
- Diego: $720/5 = 144$ m/min.
- Lin is faster (by 6 m/min).
- Strong: computes both unit rates AND compares directly.
- Weak: compares the unsimplified ratios (600 vs 720) without normalizing for time.

Problem 3 — Milk conversion (250 mL to cups)

- $250 / 240 \approx 1.04$ cups. So slightly more than 1 cup. Practically: 1 cup is close enough.
- Strong: uses the conversion ratio multiplicatively and explains the slight approximation.
- Weak: tries to convert mL to cups by adding/subtracting; ignores the 'about' qualifier.

Problem 4 — Feet conversion (8 ft)

- $8 \text{ ft} = 96 \text{ in}$ (12×8).
- $8 \text{ ft} = 8/3 \text{ yd} \approx 2.67 \text{ yd}$ (or 2 yd 2 ft).
- Larger unit $\rightarrow$ smaller unit: MORE of the smaller unit (96 inches $>$ 8 feet).
- Strong: clearly articulates the inverse relationship: smaller unit, more of them needed.
- Weak: confuses direction of multiplication; says $8 \text{ ft} = 96 \text{ yd}$.

Problem 5 — 25% off \$40 shirt

- Discount: $25\% \text{ of } \$40 = \10 .
- Sale price: $\$40 - \$10 = \$30$.
- Strong: draws tape diagram showing \$40 split into 4 equal parts (\$10 each), with one part as the discount.
- Weak: subtracts 25 from 40 (gets \$15); or computes 25% and forgets to subtract from \$40.
- ★ Tape diagram showing $25\% = 1/4$ is a key Unit 3 connection.

Problem 6 — Mai's test percent

- $18/24 = 0.75 = 75\%$.
- Strong: connects fraction to percent through equivalent ratios with 100 ($18:24 = 75:100$).
- Weak: divides without converting; reports 0.75 instead of 75%; or computes $24-18=6$ and reports 6%.

Problem 7 — 30% of ? is 45

- If 30% $\rightarrow$ 45, then 10% $\rightarrow$ 15, and 100% $\rightarrow$ 150.
- Strong: uses double number line or benchmark percentages to scale up; doesn't get stuck.
- Weak: divides 45 by 30 and gets 1.5 (or multiplies by 30 and gets 1350).
- ★ This is the inverse percentage question — a major Unit 3 challenge. Whether students can find the whole given a part-percentage shows real understanding.

Problem 8 — Successive discounts error

- Andre is WRONG. On a \$100 sweater: 20% off $\rightarrow$ \$80. Then 30% off \$80 = \$24 off $\rightarrow$ \$56. Total discount = \$44, NOT \$50.
- Strong: realizes the second discount is on a SMALLER base.
- Weak: agrees with Andre because $20+30=50$.
- ★ This common percentage misconception is a great diagnostic — successive percentages don't simply add.

Problem 9 — Compare grocery deals

- Store A: $9/5 = \$1.80$ per lb.
- Store B: $5.40/3 = \$1.80$ per lb.
- Same unit rate! Same deal.
- Strong: notices they're equivalent. Doesn't pick arbitrarily.
- Weak: picks one (often Store A because $\$9 < \5.40 looks 'bigger', or because '5 lb is more'); fails to normalize.

Problem 10 — Reflection on unit rates

- Strong: ratios are flexible but unit rates are easier to compare directly; for comparisons, unit rates win; for scaling problems, ratios may be more natural.
- Weak: 'unit rates are better' with no nuance.

Problem 11 — Class is 60% girls, 18 girls $\rightarrow$ boys?

- If 60% = 18 girls, then 100% = 30 students total. Boys = $30 - 18 = 12$.
- Method 1: find 10% (= 3), scale to 100% (= 30), subtract.
- Method 2: girls/total = $18/30 = 60\%$, so boys = $40\% = 12$.
- Strong: TWO genuinely different methods; identifies that the answer is 12 (not $18 \times 40\%/60\%$ which is the same thing presented differently).
- Weak: uses the same method twice; computes 60% of 18 (= 10.8) by mistake.