

Grade 7 • Unit 4 • Assessment Guide

Proportional Relationships and Percentages

For the Parent or Teacher — What to look for

Unit 4 is the percent unit. THE central trap: percent INCREASE then DECREASE doesn't get you back where you started (because the base changed). Other common errors: confusing 'percent of' with 'percent more than,' multiplying instead of dividing when finding the original, and treating successive percent changes additively. Look at problem 8 carefully — it's the deepest test.

Part A — Mental percent

- 8, 10, 18, 2.5, 9, 150, 45, 2.
- ★ Watch for fluency with 'easy' percents (10%, 25%, 50%, 1%) — these should be automatic.
- 150% of 30: tests understanding that 100% = the whole, so 150% > whole.
- 0.5% of 400: tests fractional percents (half of 1% = 2).

Problem 1 — Shirt discount

- (a) \$10 decrease.
- (b) $10/40 = 25\%$ decrease.
- (c) $30 = 40 \times 0.75$.
- Weak answers compute $(40-30)/30 = 33\%$ — they divided by NEW instead of ORIGINAL.
- ★ Always divide change by the ORIGINAL base.

Problem 2 — Town growth

- Increase: 1500. Percent: $1500/5000 = 30\%$.
- New = 5000×1.30 .
- ★ The multiplier 1.30 is the key Unit 4 idea. Strong students recognize $100\% + 30\% = 130\% = 1.30$.

Problem 3 — Finding the original (discount)

- \$48 = 80% of original, so original = $48/0.8 = \$60$.
- ★ THE most diagnostic problem. The common wrong approach is to ADD 20% of \$48 (\$9.60) back, getting \$57.60. WRONG because the 20% is of the ORIGINAL, not the discounted price.
- Strong: sets up the equation $0.80 \times P = 48$ and solves.
- Weak: multiplies \$48 by 1.20.

Problem 4 — Salary before increase

- $\$50,000 = 1.25 \times \text{Old}$, so Old = \$40,000.
- ★ Same structure as #3 but with increase. Watch for $\$50,000 \times 0.75 (= \$37,500)$ — wrong, but a tempting answer.

Problem 5 — Tax and tip

- Tax: $0.08 \times 54 = \$4.32$.
- Tip: $0.18 \times 54 = \$9.72$ (tip on PRE-TAX).
- Total: $54 + 4.32 + 9.72 = \$68.04$.
- Strong: handles each percent separately on the same base. Weak: takes percent of the tax-included total for the tip.

Problem 6 — Markup then discount

- After markup: $40 \times 1.60 = \$64$.
- After discount: $64 \times 0.75 = \$48$.
- Customer pays $\$48 / \$40 = 120\%$ of wholesale.
- ★ The deeper insight: $1.60 \times 0.75 = 1.20$, so a single equivalent is 'markup by 20%.'
- Strong: connects the two multipliers. Weak: thinks $+60\%$ then $-25\% = +35\%$ (additive trap).

Problem 7 — Tyler: 20% more vs 120% of

- BOTH correct. $50 \times 1.20 = 60$.
- '20% MORE than 50' = $50 + 20\% \text{ of } 50 = 50 + 10 = 60$.
- '120% OF 50' = $1.20 \times 50 = 60$.
- ★ The equivalence: 'k% more than x' = '(100 + k)% of x'.
- Strong: explains the algebraic equivalence. Weak: says only one is right.

Problem 8 — Mai: +30% then -30%

- ★ THE deepest question of the unit.
- $100 \times 1.30 = \$130$. Then $130 \times 0.70 = \$91$. NOT \$100.
- Mai is WRONG. The 30% decrease is applied to \$130, not \$100.
- Strong: explains that 'percent' depends on the BASE. After the increase, the base is bigger, so the 30% decrease takes off more dollars than the 30% increase added.
- Weak: agrees with Mai or notices it's wrong but can't articulate why.
- Note: $1.30 \times 0.70 = 0.91$ (a 9% net decrease).

Problem 9 — Percent error

- Error: $|60 - 50| = 10$ m.
- Percent error: $10/60 \approx 16.7\%$.
- ★ Watch: percent error divides by ACTUAL, not by estimate. Many students divide by 50.

Problem 10 — Misleading headline

- $(12 - 8)/8 = 50\%$. Headline is technically correct.
- ★ The interesting question is misleading: a change from 8 to 12 in a year sounds like a city in crisis, but the absolute numbers are tiny. Strong answers note that percent changes on small numbers can mislead.
- Weak: 'yes it's correct, end of story.' Strong: critical reasoning about how statistics are presented.

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