

Name: _____ Date: _____

Percent Change Both Ways

GRADE 7

MATHEMATICS

B2.3

Percent changes multiply rather than add. That one fact explains why a rise and a fall of the same percent do not cancel, why two discounts are not their sum, and how to run a change backwards: divide instead of multiply.

PART A: WORK BACKWARDS

1. After a 25% rise an amount is \$75. It started at \$_____.
2. After a 10% cut an amount is \$63. It started at \$_____.
3. An amount rose from \$48 to \$60, a rise of _____%.

PART B: COMPARE THE ROUTES

4. One \$240 balance rises 10% then falls 10%. Another \$240 balance falls 10% then rises 10%. Compare the two results.

SHOW YOUR WORK

Answer: _____

5. Olivia's savings grew from \$150 to \$180. Her friend's grew from \$200 to \$236. Who had the larger percent increase?

SHOW YOUR WORK

Answer: _____

6. A reward is discounted 20%, and then a further 10% comes off the sale price. What single percent discount would give the same final price?

SHOW YOUR WORK

Answer: _____

7. Two \$180 balances: one gains 50%, the other loses 25%. Give both new amounts and the mental route you took for each.

SHOW YOUR WORK

Answer: _____

PART C: WHEN THEY DO CANCEL

8. A 100% increase followed by a 50% decrease leaves you:
Ⓐ exactly where you started Ⓑ above where you started Ⓒ below where you started
9. An amount is \$90 after a 25% cut. Before the cut it was:
Ⓐ \$120 Ⓑ \$112.50 Ⓒ \$67.50

PART D: WHICH PAIRS CANCEL?

10. Explain why a percent rise and the same percent fall do not cancel, while a 100% rise and a 50% fall do. Use numbers in your explanation.

Percent Change Both Ways

ANSWER KEY

1. 60
2. 70
3. 25
4. Both end at \$237.60, which is \$2.40 below the start. The order makes no difference, because the same two multipliers are applied either way.
5. Olivia, at 20% against her friend's 18%, even though her friend gained more dollars.
6. 28%, because 0.80 times 0.90 is 0.72, leaving 72% of the original price.
7. \$270 and \$135. Half of \$180 is \$90, so the first becomes \$270. A quarter of \$180 is \$45, so the second becomes \$135.
8. A) exactly where you started
9. A) \$120
10. Percent changes multiply. A 10% rise then a 10% fall is times 1.10 then times 0.90, which comes to times 0.99, so you end 1% down. A 100% rise then a 50% fall is times 2 then times 0.5, which is times 1 exactly, so you end where you began. A pair cancels only when the two multipliers are reciprocals of each other.

TEACHER NOTES

Extension beyond the grade-level expectation: Part A runs percent changes backwards by dividing, Part B question 2 is built so the student with the smaller dollar gain has the larger percent gain, and Part D asks for the general rule rather than one worked case.