Personal Financial Literacy

Reverse and Repair Financial Reasoning

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Identify the percent base before reversing a transaction. A 25% discount leaves $0.75p$, while 7% tax produces $1.07p$. Percent change divides the change by the original amount. Annual simple interest requires months divided by 12. Reversing a fee or savings equation means solving for its unknown, then substituting back to check the original dollars and conditions.

Worked example

A total of $\$42.40$ includes 6% tax. Find the pretax price.

1. With pretax price p, the tax-inclusive total is $p + 0.06p = 1.06p$. Set this equal to the stated receipt: $1.06p = 42.40$.

2. Solve $p = 42.40 \div 1.06 = 40$. Check $0.06(40) = 2.40$, and $40 + 2.40 = 42.40$, so the original pretax price is $\$40$.

Answer: $\$40$.

Practice Problems

Show your thinking.

1. A student says a 20% discount followed by 20% tax restores a $\$100$ price. Correct the claim.

2. A shirt costs $\$36$ after a 25% discount, before tax. Find its original price.

3. A receipt total is $\$64.20$, including 7% sales tax and no other charges. Find the pretax price.

4. A student uses $t = 6$ for a $\$900$ loan at 8% annual simple interest for 6 months. Correct the interest.

5. An 18-hour job has net pay $\$216$ after deductions of 20% of gross pay. Find the hourly gross rate.

6. A balance goes from $\$240$ to $\$300$. A student divides 60 by 300 for percent growth. Correct the rate.

7. How much principal earns $\$54$ in 1.5 years at 4% annual simple interest?

8. Plan A charges $\$8$ monthly plus $\$2$ per use. Plan B charges $\$20$ monthly with unlimited uses. At how many uses do they tie?

9. A $\$200$ deposit earns 5% annual compound interest. A student predicts $\$220$ after 2 years. Correct the balance.

10. Your income is $\$720$. Expenses total $\$595$. You want to save 20% of income. By how much must expenses fall?

Answer Key

1. False; final price $\$96$.
2. $\$48$.
3. $\$60$.
4. $\$36$.
5. $\$15$ per hour.
6. 25%.
7. $\$900$.
8. 6 uses.
9. $\$220.50$.
10. $\$19$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The discount changes 100 dollars to $100(0.80) = 80$ dollars. The tax is then calculated on this reduced selling price.

2. Tax is $0.20(80) = 16$ dollars, so the final price is $80 + 16 = 96$. Equal percentages on different bases do not cancel.

Problem 2

1. After a 25% discount, the sale price is 75% of the original price p. Thus $0.75p = 36$.

2. Divide: $p = 36 \div 0.75 = 48$. Check the discount: $0.25(48) = 12$, and $48 - 12 = 36$, matching the stated sale price.

Problem 3

1. The total equals the pretax price plus 7% of that price. For pretax price p, $1.07p = 64.20$.

2. Solve $p = 64.20 \div 1.07 = 60$. Checking gives tax $0.07(60) = 4.20$ and total $60 + 4.20 = 64.20$, so the pretax price is $\$60$.

Problem 4

1. The rate is annual, so convert the loan term: $t = \frac{6}{12} = 0.5$ year, not 6 years.

2. Substitute into $I = Prt$: $I = 900(0.08)(0.5) = 36$. The interest for the six-month term is $\$36$, rather than $\$432$.

Problem 5

1. Net pay is 80% of gross pay g, so $0.80g = 216$ and $g = 216 \div 0.80 = 270$ dollars.

2. Divide gross pay by hours: $270 \div 18 = 15$. Checking $18(15)(0.80) = 216$ confirms a gross rate of $\$15$ per hour.

Problem 6

1. Compute the growth amount: $300 - 240 = 60$ dollars. Percent growth compares this difference with the starting balance, not the ending balance.

2. The correct fraction is $\frac{60}{240} = 0.25 = 25\%$. Dividing by 300 gives 20%, which measures a different ratio and is not the growth rate.

Problem 7

1. Substitute into $I = Prt$: $54 = P(0.04)(1.5) = 0.06P$. The interest is six percent of the unknown original principal.

2. Divide: $P = 54 \div 0.06 = 900$. Verify $900(0.04)(1.5) = 54$, so the required deposit is $\$900$.

Problem 8

1. Let u be the number of uses. Equal monthly costs require $8 + 2u = 20$, so subtracting 8 gives $2u = 12$.

2. Divide by 2: $u = 6$. Then Plan A costs $8 + 2(6) = 20$, matching Plan B exactly at six uses.

Problem 9

1. Year one gives $200(1.05) = 210$ dollars. The next year earns interest on 210, not merely on the original 200.

2. Year two gives $210(1.05) = 220.50$. The omitted interest-on-interest is $0.05(10) = 0.50$, so the correct balance is $\$220.50$.

Problem 10

1. The savings target is $0.20(720) = 144$ dollars. Current savings are $720 - 595 = 125$ dollars, below the target.

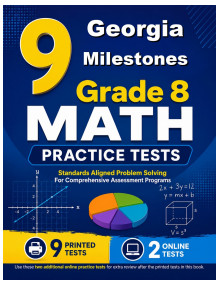
2. The shortfall is $144 - 125 = 19$. Reducing expenses by $\$19$ gives expenses 576 and savings $720 - 576 = 144$, exactly meeting the target.

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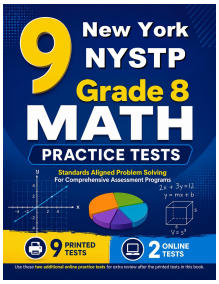
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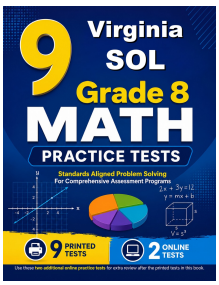
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