Discounts, Markups, and Sales Tax

Name: _____	Date: _____	Score: _____ / 17

Discounts, markups, and sales tax all use percents, but they push a price in different directions—a discount lowers it, a markup raises it, and sales tax tacks on an extra charge at the end. In multi-step problems the *order* matters, so the trick is to slow down and track each amount one step at a time. Once you get the hang of it, you will be able to decode receipts, see through "sale" signs, and understand how businesses set prices. This is real-world math at its finest!

Key Concepts & Quick Review

Discount: Sale price $=$ Original $\times\,(1-d)$, where d is the discount rate.
Markup: Retail price $=$ Cost $\times\,(1+m)$, where m is the markup rate.
Sales tax: Total $=$ Sale price $\times\,(1+t)$, where t is the tax rate.

Discount/markup first, then apply tax to the new price.

Examples

① A \$80 jacket is on sale at 30% off. Sales tax is 8%. Find the sale price and the total cost after tax.

Think It Through: Sale price: $80 \times (1-0.30) = 80 \times 0.70 = \$56.00$. Tax: $56 \times 0.08 = \$4.48$. Total: $56 + 4.48 = \$60.48$.

Answer: *Sale price:* $\$56.00$*; total with tax:* $\$60.48$

② A store buys a toy for $\$24$ (wholesale cost) and applies a 65% markup. A customer then uses a 20% off coupon. What is the final price the customer pays?

Think It Through: Retail price: $24 \times 1.65 = \$39.60$. After 20% coupon: $39.60 \times 0.80 = \$31.68$.

Answer: *Final price:* $\$31.68$

Practice Problems

Find the sale price (after discount), retail price (after markup), or total (after tax).

1. An item costs \$60 and is discounted 25%. Find the sale price. _____
2. An item costs \$120 and is discounted 30%. Find the sale price. _____
3. An item costs \$45 and is discounted 10%. Find the sale price. _____
4. An item costs \$200 and is discounted 15%. Find the sale price. _____
5. An item costs \$85 and is discounted 40%. Find the sale price. _____
6. An item costs \$35 and is discounted 20%. Find the sale price. _____

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7. A store pays \$18 for an item and adds a 50% markup. Find the retail price.

8. A store pays \$40 for an item and adds a 75% markup. Find the retail price.

9. A store pays \$60 for an item and adds a 30% markup. Find the retail price.

10. A store pays \$25 for an item and adds an 80% markup. Find the retail price.

11. An item costs \$50 before tax. Sales tax is 6%. Find the total cost.

12. An item costs \$120 before tax. Sales tax is 8.5%. Find the total cost.

13. An item costs \$75 before tax. Sales tax is 7%. Find the total cost.

14. An item costs \$200 before tax. Sales tax is 9%. Find the total cost.

15. An item costs \$90, is discounted 20%, and then has 8% sales tax added. Find the final total.

Study Tips

- Use the **one-step multiplier** method: a 25% discount means you pay 75%, so multiply by 0.75 rather than subtracting in two steps.
- Sales tax is always applied **after** the discount — never to the original price. Sequence: discount first, tax second.
- A markup of 100% doubles the cost. A markup of 50% gives a retail price $1.5\times$ the cost.

Word Problems

16. A sporting goods store buys running shoes at wholesale for $\$48$ per pair and marks them up by 85%. During a clearance sale the retail price is discounted 30%. Sales tax in the state is 8.25%. Find the retail price, the sale price, and the total a customer pays including tax.

17. A phone originally costs $\$650$. A store offers two deals: Deal A is 20% off then 8% tax. Deal B is 8% tax first then 20% off the total. Calculate the final price under each deal. Are they the same?

Answer Keys

1) $45.00
2) $84.00
3) $40.50
4) $170.00
5) $51.00
6) $28.00
7) $27.00
8) $70.00
9) $78.00
10) $45.00
11) $53.00
12) $130.20
13) $80.25
14) $218.00
15) $77.76
16) Retail: $\$88.80$; sale: $\$62.16$; total with tax: $\approx \$67.29$.
17) Deal A: $\$561.60$; Deal B: $\$561.60$; yes, they are the same.

Step-by-Step Explanations

Strategy: For Constant of Proportionality (k), divide the output by the input to find the single multiplier that connects every ordered pair. This is where students should get comfortable seeing k as a multiplier, not just a letter.

Practice 1: In the proportional relationship $y = kx$, use $y = 12$ and $x = 3$ to find k. **Answer:** 4
At the beginning of the practice, divide output by input: k is the multiplier from x to y.

Practice 15: In the proportional relationship $y = kx$, use $k = 1.5$ and $x = 10$ to find y. **Answer:** 15
For the second model problem, use the given multiplier directly: once k is known, $y = kx$.

Word-problem notes:

16. Answer: $k = \frac{3}{4}$ cup/dozen; $y = \frac{3}{4}x$; 10 dozen needs 7.5 cups.
The problem asks for cups per dozen, so divide cups by dozens: $\left(\frac{3}{2}\right) \div 2 = \left(\frac{3}{2}\right) \times \left(\frac{1}{2}\right) = \frac{3}{4}$. So the constant of proportionality is $\frac{3}{4}$ cup per dozen. That gives the equation $y = \frac{3}{4}x$, where x is dozens of cookies. For 10 dozen, $y = \frac{3}{4} \times 10 = \frac{30}{4} = 7.5$ cups.

17. Answer: Painter A: $k = 0.75$ room/hr; Painter B: $k = 0.5$ room/hr; Painter A is faster.
Painter A is already given in rooms per hour, so $k = \frac{3}{4} = 0.75$ room per hour. For Painter B, convert square feet per hour into rooms per hour. If one room is 90 square feet and Painter B completes 45 square feet each hour, then $45 \div 90 = \frac{1}{2} = 0.5$ room per hour. Comparing 0.75 and 0.5 shows that Painter A works faster.

18. Answer: Marked point $(2, 5)$; $k = \frac{5}{2} = 2.5\,mph$; $y = 2.5x$; at $7\,hr$, $y = 17.5\,mi$.
Read the lattice point on the line: it sits at $(2, 5)$. Apply $k = \frac{y}{x}$: $k = \frac{5}{2} = 2.5$, in miles per hour. The equation is $y = 2.5x$. To predict the distance after 7 hours, substitute: $y = 2.5 \times 7 = 17.5\,mi$.

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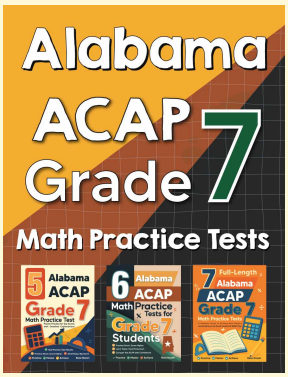

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