

Discounts, Markups, and Sales Tax

Name: _____

Date: _____

Score: _____ / 17

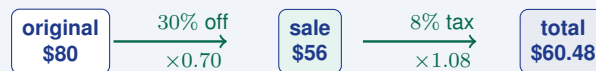
Discounts, markups, and sales tax all use percents, but they push a price in different directions—a discount lowers it, a markup raises it, and sales tax tacks on an extra charge at the end. In multi-step problems the *order* matters, so the trick is to slow down and track each amount one step at a time. 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).

- An item costs \$60 and is discounted 25%. _____ Find the sale price.
- An item costs \$120 and is discounted 30%. Find the sale price.
- An item costs \$45 and is discounted 10%. _____ Find the sale price.
- An item costs \$200 and is discounted 15%. Find the sale price.
- An item costs \$85 and is discounted 40%. _____ Find the sale price.
- An item costs \$35 and is discounted 20%. _____ Find the sale price.



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

- | | |
|--|--|
| <p>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</p> | <p>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.</p> |
|--|--|

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: $(\frac{3}{2}) \div 2 = (\frac{3}{2}) \times (\frac{1}{2}) = \frac{3}{4}$. 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.

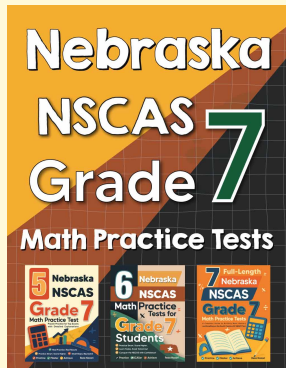
18. Answer: Marked point $(2, 5)$; $k = \frac{5}{2} = 2.5$ mph; $y = 2.5x$; at 7 hr, $y = 17.5$ mi.

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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