

# Arithmetic Practice: Percentages, Ratios, Exponents, and Variables

## Instructions

Solve each problem. Write exact answers; simplify fractions. For percent problems, show the final answer as a number with units when appropriate. For variable expressions, simplify fully. Not timed.

## A. Percentages

1. Find 15% of 240.
2. 72 is what percent of 96?
3. Increase 80 by 12.5%.
4. Decrease 150 by 30%.
5. A shirt costs \$45 and is discounted by 20%. What is the sale price?
6. A bill is \$64. Add 8.5% tax. What is the total?

## B. Ratios and Rates

7. Simplify the ratio 18 : 24.
8. A mix uses a ratio of 3 : 5 (red to blue). If there are 40 total parts, how many parts are blue?
9. A recipe uses 2 cups of sugar for 5 cups of flour. How many cups of sugar are needed for 20 cups of flour?
10. A car travels 210 miles in 3.5 hours. Find the unit rate in miles per hour.
11. The ratio of boys to girls is 7 : 9. If there are 144 students total, how many girls are there?
12. A store sells 8 items for \$14.40. What is the unit price per item?

## C. Exponents

13. Simplify  $2^3 \cdot 2^5$ .

14. Simplify  $\frac{3^7}{3^4}$ .

15. Simplify  $(4^2)^3$ .

16. Simplify  $5^0 + 2^3$ .

17. Simplify  $\frac{2^6 \cdot 5^2}{10^2}$ .

## D. Variable Expressions

18. Simplify  $3x + 7x - 5$ .

19. Simplify  $4a - 3(2a - 5)$ .

20. Simplify  $\frac{2x^2y}{4xy^2}$ .