Algebra 1 Practice: Proportions and Quadratic Equations

Instructions

Our next unit will be Proportional Relationships. This unit is a combination of work from Singapore Math (Chapter 5) and Open Up Resources (Units 1-3). The standards-based score for both units will be assessed by a variety of key assignments, Exit Tickets, assessments, and possible performance tasks.

Complete in 30 minutes. Give exact answers (fractions, radicals) unless a decimal is requested.

Formulas

- Quadratic formula: for $ax^2 + bx + c = 0$, $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.
- Proportion: two ratios are equal, $\dfrac{a}{b} = \dfrac{c}{d}$ with $b \neq 0$, $d \neq 0$.
- Cross-products property: if $\dfrac{a}{b} = \dfrac{c}{d}$, then $ad = bc$.

Problems

1. Solve: $x^2 - 9x + 18 = 0$.

2. Solve: $3x^2 + 5x - 2 = 0$.

3. Solve: $x^2 - 11x + 24 = 0$.

4. Solve: $2x^2 - 7x + 3 = 0$.

5. Solve: $x + \dfrac{1}{x} = 2$.

6. Solve: $x + \dfrac{1}{x} = -3$.

7. Solve: $x^2 + 6x + 1 = 0$.

8. Solve: $5x^2 - 20 = 0$.

9. A recipe uses 3 cups of flour for 8 servings. How many cups of flour are needed for 20 servings?

10. A map scale is 1 inch : 12 miles. Two towns are 7.5 inches apart on the map. What is the actual distance?

11. A store sells 6 notebooks for \$7.80. Find the unit price per notebook.

12. A 2.5 lb bag of rice costs \$4.25. Find the unit price per pound.

13. A car travels 180 miles in 3 hours at constant speed. How far will it travel in 5 hours?

14. A mix uses a ratio of 5 parts blue to 3 parts yellow. If there are 24 parts total, how many parts are blue?

15. A unit price problem: A 12 oz bottle costs \$3.75. A 20 oz bottle costs \$5.60. Which has the lower unit price, and what is that unit price?

16. A proportional relationship passes through $(4, 10)$. Find the constant of proportionality and the equation.