

Radical Exponents and Algebra Review (Algebra II)

Instructions

Solve each problem. Show clear work. Aim to finish in 60 minutes or less. Unless stated otherwise, assume variables are real; when simplifying even roots, use absolute value as needed to keep results nonnegative. When simplifying expressions, rewrite with positive exponents.

Problems

1. Simplify $(27x^3y^{-2})^{\frac{2}{3}}$ (assume $x > 0$, $y > 0$).
2. Simplify $(16a^4b^6)^{\frac{3}{4}}$; indicate where absolute values are required.
3. Simplify $\frac{x^{3/2}y^{-1/2}}{x^{-1/2}y^{3/4}}$ (assume $x > 0$, $y > 0$).
4. Simplify $\sqrt{25u^2v^4w^3}$, using absolute values where appropriate.
5. Simplify $\sqrt{81t^2(t-4)^4}$, expressing any absolute values needed.
6. Solve for $x \geq 0$: $x^{3/2} = 27$.
7. Factor and solve $6x^2 - 7x - 5 = 0$.
8. Solve the inequality $2(3 - x) \leq 5x + 1$.
9. Factor completely: $x^3 - 4x^2 - x + 4$.
10. Solve $4z^2 + 4z + 7 = 0$ using the quadratic formula; give roots in $a + bi$ form.
11. Simplify using exponent rules: $(5p^{-2}q^{1/2})\left(\frac{p^3}{q}\right)$.
12. Find the vertex of $y = -2x^2 + 8x - 1$ and state whether it is a maximum or minimum; give the extreme value.