

Radicals and Rational Exponents Made Clear

Grade 11 – Algebra 2 math · Test · Standards: N-RN.A.1, N-RN.A.2, A-REI.A.2

Name: _____ Date: _____ Class: _____

This test covers evaluating roots and rational exponents, simplifying radical expressions, and solving radical equations with extraneous checks. Show every step, give exact answers unless a decimal is requested, and check candidate solutions. No calculator is needed. The test is worth 20 points.

Standards: N-RN.A.1, N-RN.A.2, A-REI.A.2 · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Evaluate (2 points)

Evaluate each expression.

- a. $\sqrt[3]{-216}$
- b. $32^{3/5}$
- c. $81^{-3/4}$
- d. $\sqrt[4]{625}$

(0.5 point each)

Question 2 Changing forms (2 points)

Complete each part.

- a. Write $\sqrt[5]{x^3}$ with a rational exponent. (1 point)
- b. Write $y^{7/4}$ as a radical. (1 point)

Question 3 Simplify radicals (3 points)

Simplify. Assume all variables are positive.

- a. $\sqrt{98x^6}$ (1 point)
- b. $\sqrt[3]{81y^5}$ (2 points)

Question 4 Exponent rules (2 points)

Simplify. Assume $x > 0$ and $a > 0$.

a. $(x^{3/2} \cdot x^{1/4}) / (x^{-1/4})$ (1 point)

b. $(16a^{4/3})^{3/4}$ (1 point)

Question 5 Radical expressions (3 points)

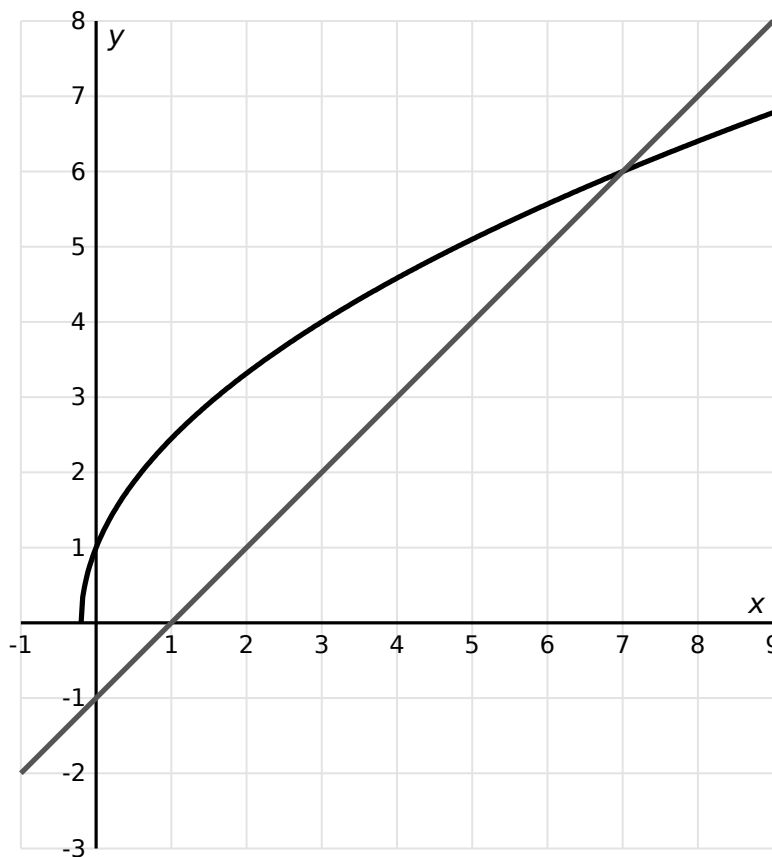
Simplify.

a. $3\sqrt{20} + \sqrt{45}$ (1 point)

b. Rationalize the denominator: $\frac{10}{(3 - \sqrt{2})}$ (2 points)

Question 6 Radical equation and its graph (3 points)

The graphs of $y = \sqrt{5x + 1}$ and $y = x - 1$ are shown.



Both graphs.

a. Solve $\sqrt{5x + 1} = x - 1$ algebraically and check each candidate. (2 points)

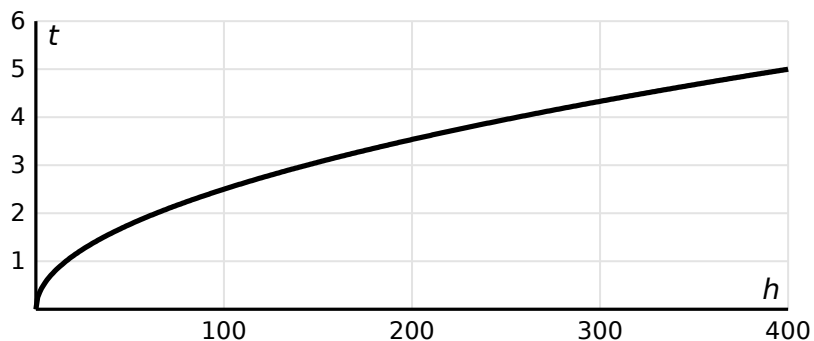
b. Use the graph to explain which candidate is extraneous. (1 point)

Question 7 Two radicals (3 points)

Solve $\sqrt{x+3} + \sqrt{x} = 3$. Check the answer.

Question 8 Falling time (2 points)

The time t (seconds) for a stone to fall h feet is $t = \sqrt{h} / 4$. The graph is shown.



Fall time against height.

- How high is a cliff if the fall takes 3.5 seconds? (1 point)
- How long does a 144-foot fall take? (1 point)