

Working with Exponents, Roots and Fractional Powers

Grade 9 – Algebra 1 math · Test · Standards: N-RN.A.1, N-RN.A.2

Name: _____ Date: _____ Class: _____

This test has 9 questions worth 20 points in total. Give answers with positive exponents, exact radical forms and decimals only when asked. A calculator is allowed. Plan on about 45 minutes.

Standards: N-RN.A.1, N-RN.A.2 · **Level:** Grade 9 Algebra 1

Time: 45 minutes · 9 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Multiply monomials (2 points)

Simplify $(6a^4b)(-2a^3b^5)$.

Question 2 Divide monomials (2 points)

Simplify $20m^9n^3 / 5m^4n^8$ and write the answer with positive exponents.

Question 3 Power of a product (2 points)

Simplify $(-2x^3y)^4$.

Question 4 Evaluate rational exponents (2 points)

Evaluate (a) $27^{2/3}$ (1 point) and (b) $4^{-3/2}$ (1 point).

Question 5 Radical and exponent forms (2 points)

(a) Write $\sqrt[3]{x^7}$ with a rational exponent. (1 point) (b) Write $a^{5/2}$ as a radical. (1 point)

Question 6 Simplify square roots (3 points)

Simplify each radical (variables are nonnegative). (a) $\sqrt{98}$ (1 point) (b) $\sqrt{45}$ (1 point) (c) $\sqrt{(20x^6)}$ (1 point)

Question 7 Rectangle with radicals (3 points)

A rectangle has width $\sqrt{12}$ cm and length $\sqrt{27}$ cm.

$\sqrt{12}$ cm



$\sqrt{27}$ cm

A rectangle with radical side lengths.

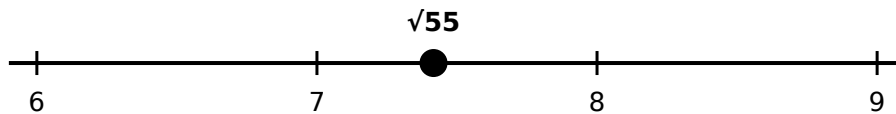
(a) Write each side in simplest radical form. (1 point) (b) Find the exact area. (1 point) (c) Find the exact perimeter. (1 point)

Question 8 Radioactive decay (3 points)

The mass of a sample in grams is $A = 80(1/2)^{t/4}$ after t hours. (a) Find the mass at $t = 12$. (1 point) (b) Find the exact mass at $t = 2$ and approximate it. (1 point) (c) Explain what the 4 in the exponent means. (1 point)

Question 9 Locate a root (1 point)

Between which two consecutive integers does $\sqrt{55}$ lie? Use the number line.



The point $\sqrt{55}$.