

Algebra 2 - Radicals and Rational Exponents - Worksheet

Common Core N-RN.A.1, N-RN.A.2 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice radicals and rational exponents (Common Core N-RN.A.1 and N-RN.A.2). The first problems check converting between radical and exponent form, the middle problems add evaluating powers and simplifying with the exponent rules, and the last six are word problems and multi-step tasks that need solving power equations and applying exponents in science and finance.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **N-RN.A.1, N-RN.A.2**

Exercise 1 - Radical form

Rewrite $5^{1/3}$ as a radical.

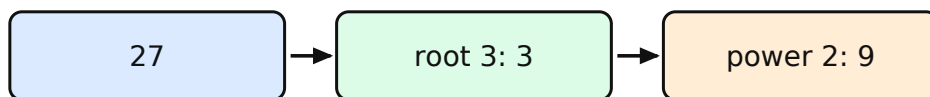
Exercise 2 - Exponent form

Rewrite $\sqrt[4]{x^3}$ using a rational exponent.

Exercise 3 - Square root

Evaluate $49^{1/2}$.

Exercise 4 - Root then power



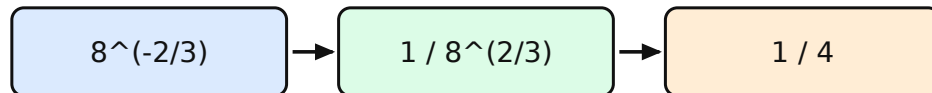
Evaluate $27^{2/3}$ in two moves: root first, then power.

Evaluate $27^{2/3}$.

Exercise 5 - Fourth root

Evaluate $16^{3/4}$.

Exercise 6 - Negative rational exponent



Reciprocal first.

Evaluate $8^{-2/3}$.

Exercise 7 - Fraction base

Evaluate $\left(\frac{1}{25}\right)^{3/2}$.

Exercise 8 - Multiply powers

Simplify $x^{2/3} \cdot x^{1/6}$.

Exercise 9 - Power of a power

Simplify $\left(y^{3/4}\right)^{2/3}$.

Exercise 10 - Divide powers

Simplify $\frac{x^{7/6}}{x^{1/2}}$.

Exercise 11 - Power of a product

Simplify $(81x^8)^{1/4}$.

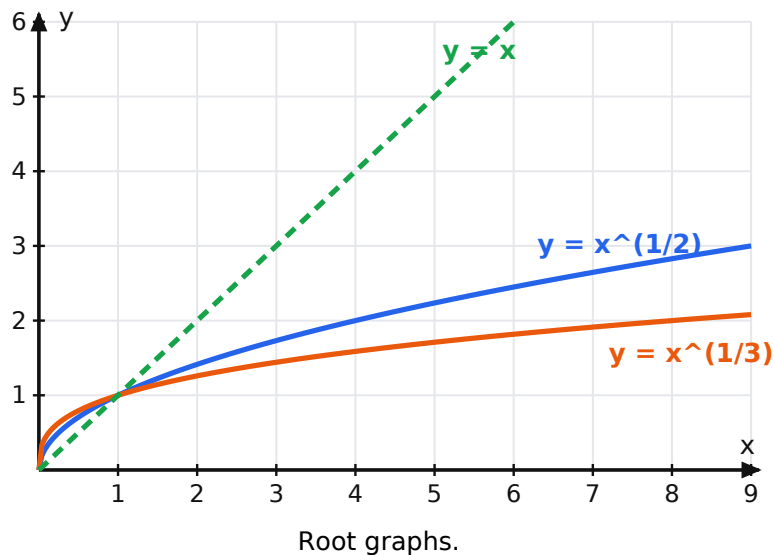
Exercise 12 - Two radicals

Write $\sqrt{x} \cdot \sqrt[3]{x}$ as a single power of x .

Exercise 13 - Two variables

Simplify $\frac{a^{2/3}b^{-1/2}}{a^{-1/3}b^{1/2}}$ and write with positive exponents.

Exercise 14 - Solve a power equation

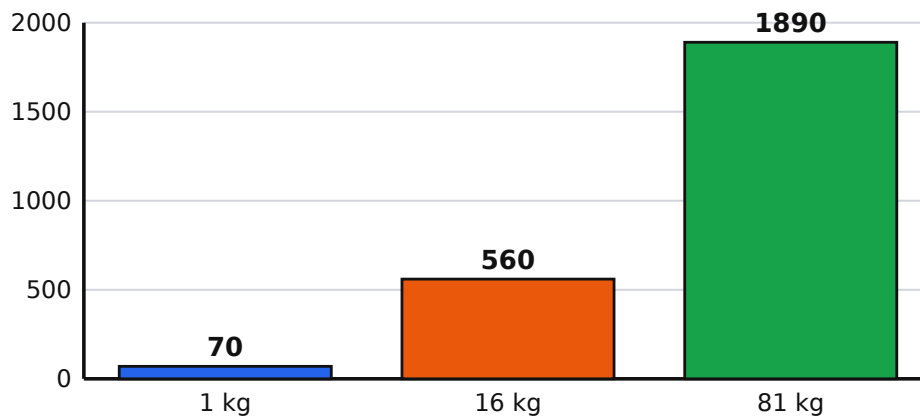


Solve $x^{3/2} = 27$.

Exercise 15 - Two solutions

Solve $(x+1)^{2/3} = 4$.

Exercise 16 - Metabolic rate



Metabolic rate grows more slowly than mass.

The resting metabolic rate of a mammal is modeled by $R = 70m^{3/4}$ kilocalories per day, where m is its mass in kilograms. Find R for a dog with mass 16 kg. The chart shows rates for three masses.

Exercise 17 - Orbit

a (AU)	T = $a^{3/2}$
4	?
9	?

Two planets.

For a planet orbiting a star, the orbital period in years is $T = a^{3/2}$, where a is the average distance in astronomical units. Find T for a planet with $a = 4$ and for one with $a = 9$.

Exercise 18 - Doubling

An investment doubles in value every 3 years, so its yearly growth factor is $2^{1/3}$. Find its value multiplier after 6 years and after 9 years.

Exercise 19 - Find the error

Jamal wrote $16^{3/2} = 16 \cdot \frac{3}{2} = 24$. Identify the mistake and find the correct value.

Exercise 20 - Justify the definition

Show that $5^{1/2} \cdot 5^{1/2} = 5$ and explain why this means $5^{1/2} = \sqrt{5}$.

Exercise 21 - Mixed expression

Simplify $\left(\frac{27x^3}{8y^6}\right)^{2/3}$.