

Laws of Integer Exponents Made Simple

Grade 8 math · Worksheet · Standards: 8.EE.A.1

Name: _____ Date: _____ Class: _____

These 20 problems cover Standard 8.EE.A.1: generating equivalent numerical expressions with integer exponents. They start with repeated multiplication and finish with word problems about chains, batches and missing exponents.

Work in order. Name the rule before each step, rewrite negative exponents as fractions, and put every final answer in simplest form.

Standards: 8.EE.A.1 · **Level:** Grade 8

Problem 1 Repeated multiplication (easy)

Write each power as repeated multiplication, then evaluate: (a) 4^3 (b) $(-2)^5$ (c) 10^4

Problem 2 Zero and negative exponents (easy)

Evaluate: (a) 7^0 (b) 2^{-4} (c) 10^{-3}

Problem 3 Product rule (easy)

Write each product as one power: (a) $6^5 \cdot 6^2$ (b) $m^9 \cdot m^4$

Problem 4 Quotient rule (easy)

Write $6^5/6^2$ as one power, using the picture to explain what cancels.



Top: five factors of 6. Bottom: two factors of 6.

Problem 5 Power of a power (easy)

Simplify using the picture: $(2^3)^2$. Then simplify $(n^5)^2$.



Two boxes of 2^3 .

Problem 6 Counting factors (easy)

The row shows $3^4 \cdot 3^2$. Write it as one power and find its value.



Four factors of 3 and two more factors of 3.

Problem 7 Negative exponents as fractions (medium)

Rewrite without a negative exponent and simplify: (a) 4^{-3} (b) $(\frac{1}{5})^{-2}$

Problem 8 Mixed exponents, one base (medium)

Evaluate: (a) $5^{-2} \cdot 5^4$ (b) $7^3 \cdot 7^{-5}$

Problem 9 Power of a product (medium)

Simplify: (a) $(5y)^3$ (b) $(4m^2)^3$ (c) $(2a^3)^2$

Problem 10 Power then divide (medium)

Evaluate $(5^2)^3 \div 5^4$.

Problem 11 Fractions to a power (medium)

Evaluate: (a) $(\frac{2}{3})^3$ (b) $(\frac{3}{4})^{-2}$

Problem 12 Positive exponents only (medium)

Rewrite with positive exponents: (a) x^{-3} (b) $5a^{-2}$ (c) $\frac{1}{y^{-4}}$

Problem 13 Complete the pattern (medium)

Fill in the three missing values in the table of powers of 5 and describe the pattern.

5^3	5^2	5^1	5^0	5^{-1}	5^{-2}
125	25	?	?	?	1/25

Powers of 5 with three missing values.

Problem 14 Find the error (medium)

Zoe wrote $4^3 \cdot 4^2 = 16^5$. Explain her mistake and give the correct result as a power and as a number.

Problem 15 Share chain (hard)

A school announcement is texted to 3 students in round 1. In each later round, every student who just received it texts 3 new students. After 6 rounds, 3^6 students have received it in round 6. How many students received it in round 6, and how many times as many as in round 4?

Problem 16 Nested powers (hard)

Evaluate $(2^{-3} \cdot 2^8)^2 \div 2^7$.

Problem 17 Simplify with two variables (hard)

Simplify and write with positive exponents: $(x^{-2}y^3)^{-2}$.

Problem 18 Compare three values (hard)

Order from least to greatest: 2^{-3} , $(-2)^{-3}$, -2^3 . Explain each value.

Problem 19 Cookie batches (hard)

A baker uses 2^{-3} cup of oats per cookie and bakes 2^6 cookies for the county fair. How many cups of oats does the baker use? Write the answer as a power of 2 and as a number.

Problem 20 Missing exponents (hard)

Find each missing exponent: (a) $7^n \cdot 7^{-4} = 7^9$ (b) $(5^m)^3 = 5^{18}$ (c) $3^k \div 3^{-2} = 3^7$