LESSON MAKER PRO

Power Scale Quest

Use roots, exponents, and scientific notation to solve real problems.

GRADE 8 · 8.NR.2

8.NR.2 "Solve problems involving radicals and integer exponents including relevant application situations; apply place value understanding with scientific notation and use scientific notation to explain real phenomena."

NAME _____ DATE _____

THE BIG IDEA

The principal square root, written sqrt(n), is the nonnegative number whose square is n. For nonzero a, $a^{-n} = 1/a^n$. When you multiply scientific notation, multiply coefficients and add exponents, and when you divide, divide coefficients and subtract exponents, then adjust the coefficient to be at least 1 and less than 10.

WORKED EXAMPLE

Write $(8.4 \times 10^9) / (2.1 \times 10^5)$ in scientific notation.

1. Divide the coefficients: 8.4 / 2.1 = 4.
2. Subtract the exponents: $10^9 / 10^5 = 10^{(9 - 5)} = 10^4$.
3. Combine the results: 4×10^4.

Answer: 4×10^4

PRACTICE 6 problems

1 Find sqrt(144).

ANSWER _____

2 Evaluate $(-2)^5$.

ANSWER _____

3 Write 5^{-2} as a fraction.

ANSWER _____

4 Write $(3 \times 10^6)(2 \times 10^3)$ in scientific notation.

ANSWER _____

5 Write $(9 \times 10^7) / (3 \times 10^2)$ in scientific notation.

ANSWER _____

6 Write 0.00000072 in scientific notation.

ANSWER _____

APPLY IT Show your work

1 A student saves a video file that is 4.5×10^8 bytes. Each short clip is 1.5×10^6 bytes. How many short clips have the same total size as the video file?

WORK SPACE

ANSWER _____

2 A square gaming badge has an area of 625 square pixels. What is the length of one side of the badge?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A square virtual game map has an area of 1.69×10^6 square meters. What is the length of one side of the map? Write your answer in scientific notation.

WORK SPACE AND ANSWER

ANSWER KEY

Power Scale Quest

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find sqrt(144).	**12**
2	Evaluate $(-2)^5$.	**-32**
3	Write 5^{-2} as a fraction.	**1/25**
4	Write $(3 \times 10^6)(2 \times 10^3)$ in scientific notation.	**6×10^9**
5	Write $(9 \times 10^7) / (3 \times 10^2)$ in scientific notation.	**3×10^5**
6	Write 0.00000072 in scientific notation.	**7.2×10^{-7}**

PART 2 · APPLY IT

1. **3×10^2 clips, or 300 clips** Divide 4.5 by 1.5 to get 3. Subtract the exponents, 8 - 6 = 2, so the result is 3×10^2 clips.
2. **25 pixels** A side length squared equals the area. Since $25^2 = 625$, the side length is 25 pixels.

CHALLENGE

1.3×10^3 meters

Accept equivalent forms such as 300 for 3×10^2 when the question does not require scientific notation. For square roots, accept only the principal, nonnegative root.