

WARM UP

Simplify each expression.

$$\frac{y^4 x^2}{y^4 x^3}$$

$$\frac{2^{12} c^0 x^2}{2^9 c^5 x^4}$$

$$\frac{9^0 y^9 x^{12}}{9^2 y^7 x^8}$$

ESSENTIAL QUESTION

What are the properties of rational exponents and how are they used to solve problems?

NEEDED VOCAB:

► **Rational Exponents**

GOAL: "I CAN..."

Use properties of exponents to solve equations with rational exponents."

Students are asked to write an equivalent expression for 3^{-3} .

Casey and Jacinta each write an expression on the board.

Casey

$$3^{-3} = -27$$

Jacinta

$$3^{-3} = \frac{1}{27}$$

Which, if any, are correct?

EXAMPLE 1

What does $9^{\frac{1}{2}}$ equal?

What does $8^{\frac{1}{3}}$ equal?

EXAMPLE 2 Solve for the value of x .

$$2^x \cdot 2^{2x} = 2^6$$

What is the solution of $(3^{\frac{x}{2}})(3^{\frac{x}{3}}) = 3^9$?

What is the solution of $(2^{\frac{x}{4}})(2^{\frac{x}{6}}) = 2^3$?

EXAMPLE 3 What is the solution of $27^{x-4} = 3^{2x-6}$?

What is the solution of $\left(\frac{1}{125}\right)^{-\frac{x}{2}} = \left(\frac{1}{25}\right)^{-\frac{x}{3} - 2}$?

What is the solution of each equation?

a. $256^{x+2} = 4^{3x+9}$

b. $\left(\frac{1}{8}\right)^{\frac{x}{2} - 1} = \left(\frac{1}{4}\right)^{\frac{x}{3}}$

EXAMPLE 4

Adam is setting up for an outdoor concert. He places three square blankets near the band as shown in the picture. What is the area of Blanket C?



When the side length of Blanket A is multiplied by $2\frac{1}{2}$, the result is 6 yards. Find the area of Blanket A.

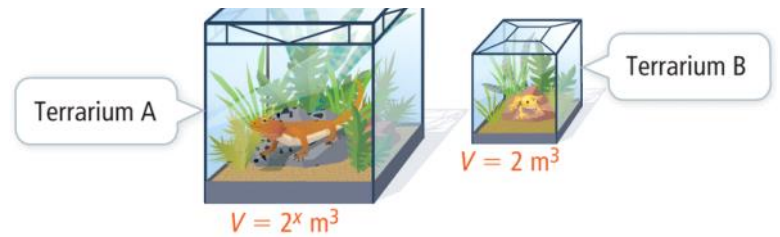


EXAMPLE 5

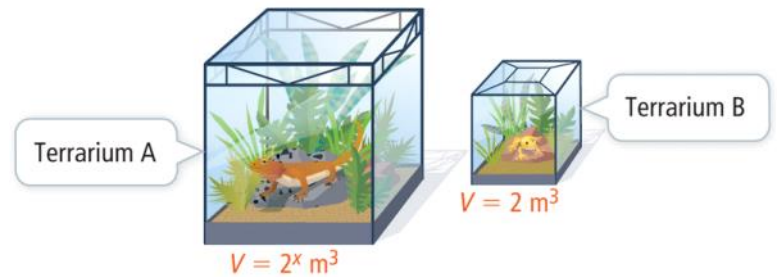
Terrarium A and Terrarium B are



Terrarium A and Terrarium B are cubes. The side length of Terrarium A is twice the side length of Terrarium B. What is the value of x ?



What is the value of x if the side length of Terrarium A is **FOUR** times the length of Terrarium B?



<https://tinyurl.com/uvpaf4r>



HOMework

Pg. 222

21, 25-30, 31-42, 47, 49