

Teacher version

Unit 5: Lesson 04 Solving equations having rational & variable exponents

Many times it is desirable to "get rid" of an exponent in the process of solving an equation. For example, consider:

$$(x-2)^{3/2} = 5$$

Simply raise both sides to the 2 power and $x-2$ will be left with no exponent. From that point it is easy to solve for x .

$$\begin{aligned} [(x-2)^{3/2}]^2 &= [5]^2 \\ (x-2)^3 &= 25 \\ x-2 &= \sqrt[3]{25} \\ x &= \sqrt[3]{25} + 2 = \boxed{5.7} \end{aligned}$$

Rule: When raising both sides of an equation to an even power (or if the numerator of a fractional power is even), extraneous roots (answers) can be produced. In this case substitute prospective roots back into the original equation to see if they really work.

Example 1: $x^{2/3} = 8$

Example 2: $(4x)^{2/3} + 5 = 0$

$$\begin{aligned} [x^{2/3}]^3 &= [8]^3 \\ x &= [8]^{3 \cdot \frac{3}{2}} \\ x &= \boxed{1024} \end{aligned}$$

$$\begin{aligned} (4x)^{2/3} &= -5 \\ [(4x)^{2/3}]^3 &= [-5]^3 \\ 4x &= -125 \\ x &= \boxed{-31.25} \end{aligned}$$

Hand written as a "real person" would do.

Teacher models notes and examples during lecture.

Assignment:

Solve for the variable and check for extraneous roots when appropriate.

1. $x^{2/3} - 12 = 14$

2. $(2x-1)^{2/3} - 2 = 0$

$$\begin{aligned} x^{2/3} &= 26 \\ [x^{2/3}]^3 &= [26]^3 \\ x &= [26^3]^3 \\ x &= (\pm \sqrt[3]{17576})^3 \\ x &= (-4.5)^3 = \boxed{-91.125} \end{aligned}$$

$$\begin{aligned} (2x-1)^{2/3} &= 2 \\ [(2x-1)^{2/3}]^3 &= 2^3 \\ 2x-1 &= 8 \\ 2x &= 8+1 \\ x &= \boxed{4.5} \end{aligned}$$

Student version

Solving equations having rational & variable exponents

Many times it is desirable to "get rid" of an exponent in the process of solving an equation. For example, consider:

Simply raise both sides to the 2 power and $x-2$ will be left with no exponent. From that point it is easy to solve for x .

When raising both sides of an equation to an even power (or if the numerator of a fractional power is even), extraneous roots (answers) can be produced. In this case substitute prospective roots back into the original equation to see if they really work.

Example 2: $(4x)^{2/3} + 5 = 0$

Blind to take notes and work the examples here. Blank assignment area.

Solve for the variable and check for extraneous roots when appropriate.

2. $(2x-1)^{2/3} - 2 = 0$

Absent-student version

Solving equations having rational & variable exponents

Many times it is desirable to "get rid" of an exponent in the process of solving an equation. For example, consider:

Simply raise both sides to the 2 power and $x-2$ will be left with no exponent. From that point it is easy to solve for x .

$$\begin{aligned} [(x-2)^{3/2}]^2 &= [5]^2 \\ (x-2)^3 &= 25 \\ x-2 &= \sqrt[3]{25} \\ x &= \sqrt[3]{25} + 2 = \boxed{5.7} \end{aligned}$$

When raising both sides of an equation to an even power (or if the numerator of a fractional power is even), extraneous roots (answers) can be produced. In this case substitute prospective roots back into the original equation to see if they really work.

Example 2: $(4x)^{2/3} + 5 = 0$

$$\begin{aligned} (4x)^{2/3} &= -5 \\ [(4x)^{2/3}]^3 &= [-5]^3 \\ 4x &= -125 \\ x &= \boxed{-31.25} \end{aligned}$$

Absent student takes their notes from this version. Assignment part is still blank.

Solve for the variable and check for extraneous roots when appropriate.

2. $(2x-1)^{2/3} - 2 = 0$

Blue Pelican Math Geometry Answers Second Semester

RJ Alexander



Blue Pelican Math Geometry Answers Second Semester:

Blue Pelican Math Geometry Answers Second Semester Book Review: Unveiling the Power of Words

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1. Understanding the eBook Blue Pelican Math Geometry Answers Second Semester
 - The Rise of Digital Reading Blue Pelican Math Geometry Answers Second Semester
 - Advantages of eBooks Over Traditional Books
2. Identifying Blue Pelican Math Geometry Answers Second Semester
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an eBook Blue Pelican Math Geometry Answers Second Semester
 - User-Friendly Interface
4. Exploring eBook Recommendations from Blue Pelican Math Geometry Answers Second Semester
 - Personalized Recommendations
 - Blue Pelican Math Geometry Answers Second Semester User Reviews and Ratings

- Blue Pelican Math Geometry Answers Second Semester and Bestseller Lists
- 5. Accessing Blue Pelican Math Geometry Answers Second Semester Free and Paid eBooks
 - Blue Pelican Math Geometry Answers Second Semester Public Domain eBooks
 - Blue Pelican Math Geometry Answers Second Semester eBook Subscription Services
 - Blue Pelican Math Geometry Answers Second Semester Budget-Friendly Options
- 6. Navigating Blue Pelican Math Geometry Answers Second Semester eBook Formats
 - ePub, PDF, MOBI, and More
 - Blue Pelican Math Geometry Answers Second Semester Compatibility with Devices
 - Blue Pelican Math Geometry Answers Second Semester Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Blue Pelican Math Geometry Answers Second Semester
 - Highlighting and Note-Taking Blue Pelican Math Geometry Answers Second Semester
 - Interactive Elements Blue Pelican Math Geometry Answers Second Semester
- 8. Staying Engaged with Blue Pelican Math Geometry Answers Second Semester
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Blue Pelican Math Geometry Answers Second Semester
- 9. Balancing eBooks and Physical Books Blue Pelican Math Geometry Answers Second Semester
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Blue Pelican Math Geometry Answers Second Semester
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Blue Pelican Math Geometry Answers Second Semester
 - Setting Reading Goals Blue Pelican Math Geometry Answers Second Semester
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Blue Pelican Math Geometry Answers Second Semester
 - Fact-Checking eBook Content of Blue Pelican Math Geometry Answers Second Semester
 - Distinguishing Credible Sources

13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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