Math Virtual Learning

Algebra 1 S1
Rational Exponents

May 15 , 2020

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Lesson: May 15, 2020

Objective/Learning Target:

Students will find equivalent expressions involving rational exponents.

Brainstarter

Let's Get Started

Watch the video

Let's start with writing expressions in radical form!

Remember numerator becomes power! Denominator becomes index!

$7^{\frac{1}{3}}$

$\sqrt[3]{7}$

Now Let's try a more complex exponential problem.

$$(5x)^{-\frac{5}{4}}$$

First flip the expression because of the negative exponent!

Now write the bottom in radical form

$$\frac{1}{5x^{\frac{5}{4}}}$$

Leave the 1 in the numerator alone!

You got it!

$$\frac{1}{\sqrt[4]{5 \times 5}}$$

Remember what part of fraction is power and what part is index!

Let's go the other direction from radical to exponential form.

$$\sqrt{10^3}$$

Remember that this means the square root!

The power becomes the numerator and the index becomes the denominator.

Just work backwards and make a fraction for the exponent!

$10^{2/3}$

Now a more complex problem!

$$\frac{1}{(\sqrt{3k})^5}$$

Work inside parentheses first!

Next step is to make this a whole number expression!

$$\frac{1}{(3k)^{\frac{5}{2}}}$$

Flip the fraction and make it a negative exponent!

I think you've got it!

$$(3k)^{\frac{-5}{a}}$$

YIPPEE!

Let's try something a little harder! Simplify the expression.

$9^{\frac{1}{2}}$

Write in radical form!

What is the square root of 9?

$\sqrt{9}$

3!!!!

Now it's your turn!

Write Each expression in radical form

1) $7^{\frac{1}{2}}$

2) $4^{\frac{4}{3}}$

3) $2^{\frac{5}{3}}$

4) $7^{\frac{4}{3}}$

5) $6^{\frac{3}{2}}$

6) $2^{\frac{1}{6}}$

Write Each expression in Exponential form

7) $(\sqrt{10})^3$

8) $\sqrt[6]{2}$

9) $(\sqrt[4]{2})^5$

10) $(\sqrt[4]{5})^5$

11) $\sqrt[3]{2}$

12) $\sqrt[6]{10}$

Simplify

27) $1000000^{\frac{1}{6}}$

28) $36^{\frac{3}{2}}$

29) $(x^6)^{\frac{1}{2}}$

30) $(9n^4)^{\frac{1}{2}}$

31) $(64n^{12})^{-\frac{1}{6}}$

32) $(81m^6)^{\frac{1}{2}}$

Answer Key:

Once you have completed the problems, check your answers here.

1) $7^{\frac{1}{2}}$

$\sqrt{7}$

2) $4^{\frac{4}{3}}$

$(\sqrt[3]{4})^4$

3) $2^{\frac{5}{3}}$

$(\sqrt[3]{2})^5$

4) $7^{\frac{4}{3}}$

$(\sqrt[3]{7})^4$

5) $6^{\frac{3}{2}}$

$(\sqrt{6})^3$

6) $2^{\frac{1}{6}}$

$\sqrt[6]{2}$

Answer Key:

Once you have completed the problems, check your answers here.

7) $(\sqrt{10})^3$

$10^{\frac{3}{2}}$

8) $\sqrt[6]{2}$

$2^{\frac{1}{6}}$

9) $(\sqrt[4]{2})^5$

$2^{\frac{5}{4}}$

10) $(\sqrt[4]{5})^5$

$5^{\frac{5}{4}}$

11) $\sqrt[3]{2}$

$2^{\frac{1}{3}}$

12) $\sqrt[6]{10}$

$10^{\frac{1}{6}}$

Answer Key:

Once you have completed the problems, check your answers here.

27) $1000000^{\frac{1}{6}}$

10

28) $36^{\frac{3}{2}}$

216

29) $(x^6)^{\frac{1}{2}}$

x^3

30) $(9n^4)^{\frac{1}{2}}$

$3n^2$

31) $(64n^{12})^{-\frac{1}{6}}$

$\frac{1}{2n^2}$

32) $(81m^6)^{\frac{1}{2}}$

$9m^3$

Additional Practice:

Rational Exponents