

What's Going On?

Checking In

Minds on

Solve

Action!

This is how we do it!

Consolidation

Extra Practice

Learning Goal - I will be able to solve equations involving exponents.

RAFT

In this class, you may use RAFT time to complete any outstanding work you may have.

Unit Test: Thursday

Minds on

Solve

Solve for x.

To solve an equation with more than 1 exponential expression:

$$8^{2(x+2)} = 16^{x-2}$$

Handwritten annotations: A blue arrow points from the 8 to a circled 2. A red box is drawn around the 2. A green oval encircles the entire exponent $2(x+2)$. On the right, a red box is drawn around the 16, and a green oval encircles the entire exponent $x-2$.

1. Find a common base!

$$6(x+2) = 4(x-2)$$

Handwritten annotations: Green arrows point from the circled 2 in the previous equation to the 6 and 4 in this equation.

$$6x + 12 = 4x - 4$$

Handwritten annotations: A blue $-4x$ is written below $6x$, and a blue $+4x$ is written below $4x$.

$$2x + 12 = -4$$

Handwritten annotations: A blue $+12$ is written below 12 , and a green -12 is written below -4 .

$$\frac{2x}{2} = \frac{-20}{2}$$

$$x = -10$$

Action!

This is how we do it!

To solve an equation where the variable is raised to an exponent, n , ...

$$a. \sqrt[4]{k^4} = \sqrt[4]{20}$$

$$k = 2.1$$

$$b. \frac{750}{6} = \frac{6x^5}{6}$$

$$\sqrt[5]{x^5} = \sqrt[5]{25}$$

$$x = 2.6$$

$$c. 200 = \frac{1}{3}\pi r^3$$

$$3 \cdot 200 = \frac{\pi r^3}{\cancel{3}}$$

$$600 = \frac{\pi r^3}{\cancel{\pi}}$$

$$\sqrt[3]{r^3} = \sqrt[3]{\frac{600}{\pi}}$$

$$r = 5.4$$

To solve an equation where the variable is raised to an exponent, n , ...

Isolate the variable using opposite operations, then take the n^{th} root of both sides.

$$5000 = \frac{2\pi r^4}{3}$$

$$5000 = \frac{2\pi r^4}{3}$$

Action!

This is how we do it!

To solve an equation where the variable is an exponent, ... use "systematic" guess and check. * isolate variable term first.

a. $2^x = 12$

x	2^x
3	8
4	16
3.5	11.3
3.6	12.1

x is between 3.5 and 3.6

b. $3^n = 50$

n	3^n
3	27
4	81
3.6	52.2
3.5	41.6

x is btw 3.5 & 3.6

$$c. \frac{5000}{500} = \frac{500(1.05)^t}{500}$$

isolate first

$$1.05^t = 10$$

t	1.05^t
50	11.5
49	10.4
47	9.9
47.2	10.0

$$t = 47.2$$

Action!

This is how we do it!

To solve an equation with more than one exponential expression, ...

- find a common base and "solve" the exponents... set exponents equal and solve for x

$$a. \quad 4^{2(4x-2)} = 16^{2(3x+4)}$$

$$4^{2(4x-2)} = (4^2)^{2(3x+4)}$$

$$2(4x-2) = 4(3x+4)$$

$$8x - 4 = 12x + 16$$

$$\frac{-4x}{-4} = \frac{20}{-4}$$

$$x = -5$$

$$b. 81^{3(x+1)} = 9^{2(x-1)}$$

$$(9^2)^{3(x+1)} = 9^{2(x-1)}$$

$$6(x+1) = 2(x-1)$$

$$6x + 6 = \cancel{2x} - 2$$
$$-2x$$

$$4x + 6 = -2$$
$$+6$$
$$-6$$

$$\cancel{4x} = \frac{-8}{4}$$

$$x = -2$$

$$c. 2^x = 5^{x-4}$$

- guess and check
- graph it, find
the POI

Consolidation

Extra Practice