Unit 1 :
Simplifying Radicals

Mrs. Wheaton

Foundations of Algebra

Tuesday October 24, 2017

How do I get ready for class?

1) On Desk: binder, notebook, pens/pencils
2) You are tardy if you are not in your seat when the bell rings.

Homework:

Simplifying Radicals

Upcoming……

Test next Tuesday

Warm Up:

1) Complete the square/ square root worksheet.
   (1st page of green sheet)

Get Calculator & iRespond

Exploring Squares and Square Roots

Square Multiply a number by itself 2 times	Square Root A value that can be multiplied by itself to give the original number
$1^2 = 1 \times 1 = 1$	$\sqrt{1} = 1$ or -1
$2^2 = 2 \times 2 = 4$	$\sqrt{4} = 2$ or -2
$3^2 = 3 \times 3 = 9$	$\sqrt{9} = 3, -3$
$4^2 = 16$	$\sqrt{16} = 4, -4$
$5^2 = 25$	$\sqrt{25} = 5, -5$
$6^2 = 36$	$\sqrt{36} = 6, -6$
$7^2 = 49$	$\sqrt{49} = 7, -7$
$8^2 = 64$	$\sqrt{64} = 8, -8$
$9^2 = 81$	$\sqrt{81} = 9, -9$
$10^2 = 100$	$\sqrt{100} = 10, -10$
$11^2 = 121$	$\sqrt{121} = 11, -11$
$12^2 = 144$	$\sqrt{144} = 12, -12$

Homework Review

- Substitute Apology Letter
- Polynomial Farm Task (Any Questions?)

Standard

Standard:

MGSE9-12.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Learning Goal

Students will be able to simplify and perform operations with radical expressions.

What do you already know about the learning goal?

Learning Goal

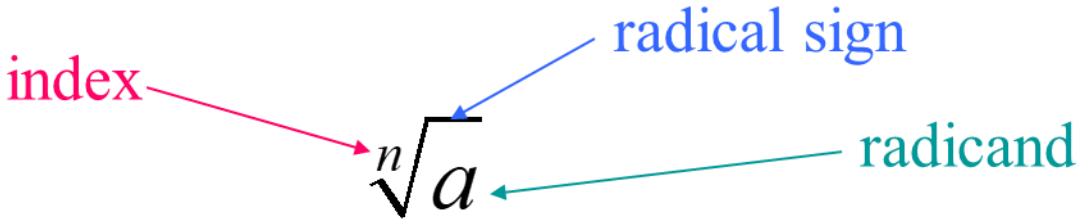
Students will be able to simplify and perform operations with radical expressions.

Scale	Rubric	# of students
4	I can **simplify complex radical expressions** and teach levels 1-3 to a peer! ☺	
3	I can perform operations with radical expressions.	
2	I can simplify radical expressions with numbers and variables.	
1	I can simplify radicals that are perfect squares, as well as other numbers.	

Radicals Expressions

Introduction to Radicals

Radical Expression



$\sqrt{}$ – This is the root or radical sign

Index – the root being taken

Radicand – Expression under the radical sign

Perfect Square	Number is NOT a Perfect Square
List of Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144 If the problem contains a perfect square: • Find the square root • The square root would be an integer **Examples:** 1) $\sqrt{25} = 5$ or -5 2) $-\sqrt{144} = -12$ or 12 3) $\sqrt{-36} =$ no real solution $6i$ or $-6i$ complex/imaginary numbers	If the problem contains a number that is not a perfect square: • Use the product of two square roots • One of these roots should be a perfect square • Find the square root of the perfect square, leave the other root as is. **Examples:** 1) $\sqrt{12} = \sqrt{4} \cdot \sqrt{3}$ $= 2\sqrt{3}$ 12: 1 · 12 ✗; 2 · 6 ✗; 4 · 3 ✓ 2) $\sqrt{32} = \sqrt{\square} \cdot \sqrt{\square}$ $\sqrt{32} = \sqrt{2} \cdot \sqrt{16}$ $= \sqrt{2} \cdot 4$ $= 4\sqrt{2}$ 32: 1 · 32 ✗; 2 · 16 ✓; 4 · 8

Simplifying Radical Expressions

1) $\sqrt{-361}$

A) -19

B) 19

C) -180

D) Not a real number

Simplifying Radical Expressions

2) $-\sqrt{256}$

A) 16

B) -128

C) -16

D) Not a real number

Simplifying Radical Expressions

$\sqrt{44}$

A) 22 B) $\sqrt{44}$ C) $4\sqrt{11}$ D) $2\sqrt{11}$

$\sqrt{44} = \sqrt{4}\,\sqrt{11}$

$= 2\sqrt{11}$

Simplifying Radical Expressions

$\sqrt{150}$

A) $15\sqrt{2}$ B) $25\sqrt{6}$ C) $5\sqrt{6}$ D) $10\sqrt{3}$

Simplifying Radical Expressions

Homework

Wednesday October 25, 2017

How do I get ready for class?

1) On Desk: binder, notebook, pens/pencils

2) You are tardy if you are not in your seat when the bell rings.

Homework:

Simplifying Radicals

Upcoming……

Test next Tuesday

Warm Up: Simplify the following radicals.

1) $\sqrt{36}$

6 or -6

2) $\sqrt{27} = \sqrt{9} \cdot \sqrt{3}$

$= 3\sqrt{3}$

3) $\sqrt{-100}$

no real solution

Homework Review

Now Grading: Simplifying Radicals

Any Questions?

Standard

Standard:

MGSE9-12.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Learning Goal

Students will be able to simplify and perform operations with radical expressions.

What do you already know about the learning goal?

Learning Goal

Students will be able to simplify and perform operations with radical expressions.

Scale	Rubric	# of students
4	I can **simplify complex radical expressions** and teach levels 1-3 to a peer! ☺	
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1	I can simplify radicals that are perfect squares, as well as other numbers.	

Radicals Expressions

$\sqrt{9}$ $\sqrt{27}$

Exponent is Even

If the problem contains an even exponent:

- Divide the exponent by 2

$\frac{1}{2}$

$\sqrt{x} = x^{\frac{1}{2}}$

$\sqrt[3]{x} = x^{\frac{1}{3}}$

$\sqrt{25x^{100}} = 5x^{50}$

Examples:

1) $\sqrt{x^4} = x^2$

2) $\sqrt{x^4y^2z^6} = x^2y^1z^3$

Simplifying Radical Expressions

Simplify the radical expression.

$$\sqrt{y^{10}}$$

A) $y\sqrt{10}$ B) y^5 C) $5\sqrt{y}$ D) y^{10}

Simplifying Radical Expressions

Simplify the radical expression.

$$\sqrt{16x^8}$$

$4x^4$

A) $16x^4$ B) $4x^8$ C) $x^4\sqrt{4}$ D) $4x^4$

Simplifying Radical Expressions

Simplify the radical expression.

$$\sqrt{100m^{10}n^{18}}$$

$\sqrt{100} = 10$

A) $50m^5n^9$

B) $10m^5n^9$

C) $50m^8n^{16}$

D) $10m^8n^{16}$

Exponent is Odd

If the problem contains an odd exponent:

- Break the problem up into 2 parts
- One should have the highest even exponent
- The other exponent should be 1
- The sum of both exponents should be the original exponent

Examples:

1) $\sqrt{x^5} = \sqrt{x^4} \cdot \sqrt{x}$

$= x^2\sqrt{x}$

2) $\sqrt{y^{11}} = \sqrt{y^{10}} \cdot \sqrt{y}$

$= y^5\sqrt{y}$

Simplifying Radical Expressions

Simplify the radical expression.

$\sqrt{t^{15}}$

$\sqrt{t^{14}}\sqrt{t}$

A) $t\sqrt[30]{t}$ B) $t\sqrt[15]{t}$ C) $t\sqrt[7]{t}$ D) $t\sqrt[8]{t}$

Simplifying Radical Expressions

Simplify the radical expression.

$$\sqrt{x^5 y^{10}}$$

$\sqrt{x^5}\sqrt{y^{10}}$

$\sqrt{x^4}\sqrt{x}\sqrt{y^{10}}$

$x^2\sqrt{x}\,y^5$

$x^2 y^5 \sqrt{x}$

A) $x^5 y^{10}$

B) $x^4 y^5 \sqrt{x}$

C) $x^2 y^5 \sqrt{x}$

D) $x^4 y^{10} \sqrt{x}$

Simplifying Radical Expressions

Simplify the radical expression.

$$\sqrt{96x^2y}$$

A) $4xy\sqrt{6}$

B) $4x^2\sqrt{6y}$

C) $4xy^2\sqrt{6}$

D) $4x\sqrt{6y}$

Learning Goal Check

Students will be able to simplify and perform operations with radical expressions.

Scale	Rubric	# of students
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2	I can simplify radical expressions with numbers and variables.	
1	I can simplify radicals that are perfect squares, as well as other numbers.	

Independent Practice

- Start working on the following problems:

_____ 7. $\sqrt{x^7}$

_____ 10. $\sqrt{40x^8}$

_____ 13. $\sqrt{a^2b^4}$

_____ 16. $\sqrt{32m^7n^{11}}$

Student- Led Closing

Answer the following problems with your table-mate.

- Explain how this lesson relates to the standard.
- Explain how you would simplify a radical using an example. (Use variables in your example)

Classwork/Homework

Complete Simplifying Radicals Worksheet

Operations with Radicals

Adding and Subtracting Radicals (See Worksheet)

9) $\sqrt{5} + \sqrt{45}$ ~~$= \sqrt{50}$~~

$1\sqrt{5} + 3\sqrt{5}$

$4\sqrt{5}$

$\sqrt{45}$ 5.9

$\sqrt{9} \cdot \sqrt{5}$

$3\sqrt{5}$

10) $\sqrt{6} + \sqrt{54}$

$\sqrt{54}$

$\sqrt{9} \cdot \sqrt{6}$

$3\sqrt{6}$

$1\sqrt{6} + 3\sqrt{6}$

$4\sqrt{6}$

Homework

#1-18

Multiplying Radicals

Homework

Operations with Radicals

Thursday August 17, 2017

How do I get ready for class?

1) On Desk: binder, notebook, pens/pencils

2) You are tardy if you are not in your seat when the bell rings.

Homework:

Operations with Radicals

Upcoming……

Test on Monday

Warm Up: Homework Review

- Let's get ready to review your homework

Homework Review

** Bren Den - Quiz

Operations with Radicals

Think of radical expressions like variable expressions or polynomials.
You can only add like terms, but you can always multiply terms together.

Adding/Subtracting Radicals

- Simplify each radical.
- Combine like terms if radicals match.

1) $2\sqrt{7} - \sqrt{28}$

Adding/Subtracting Radicals

2) $3\sqrt{5} + 2\sqrt{20}$

Adding/Subtracting Radicals

2) $3\sqrt{5} + 2\sqrt{20}$

Multiplying Radicals

- Multiply numbers by numbers and radicals by radicals.
- Simplify each radical

1) $\sqrt{3} \cdot \sqrt{3}$

Multiplying Radicals

3) $2\sqrt{12} \cdot 4\sqrt{15}$

Multiplying Radicals

4) $7\sqrt{3}(3+\sqrt{6})$

Homework

Complete Operations with Radicals