Assignments for Algebra 2
Unit 9: Review of Exponentials

Day 1 – Radical Review

Objectives: SWBAT evaluate and simplify radicals (square roots and cube roots)
Objectives: SWBAT simplify radicals that are multiplied together

	Square Roots	Cube Roots	Nth Root
What leaves?			
What stays in?			
EVEN Roots get _____		ODD Roots can be _____	
When do I use 'i'			

Evaluating

Simplifying

Evaluating radicals

1) $\sqrt{64y^6}$ **2)** $\sqrt[3]{-64}$ **3)** $\sqrt[4]{81}$ **4)** $\sqrt[5]{32}$ **a)** $\sqrt[7]{128}$

Simplify

5) $\sqrt{96}$ **6)** $\sqrt[3]{56x^6}$ **7)** $\sqrt[4]{162x^8y^{12}}$ **8)** $\sqrt[5]{1458z^{13}}$ **b)** $\sqrt[6]{256x^3}$

Multiplying Roots	Adding Subtracting Roots	Dividing Radicals
OUTSIDE RADICAL	**LIKE ROOTS**	**OUTSIDE RADICAL**
INSIDE RADICAL		**INSIDE REDUCING**
RULE	**UNLIKE ROOTS**	**RATIONALIZING THE DENOMINATOR**

11) $\sqrt{6} \bullet \sqrt{12}$

12) $3\sqrt[3]{4} \bullet \sqrt[3]{20}$

c) $\sqrt[3]{7} \bullet 4\sqrt[3]{21}$

13) $2x\sqrt[4]{9y^6}$

14) $\sqrt{6x}\left(2x^2 - \sqrt{3x}\right)$

15) $3\sqrt[3]{5}-8\sqrt[4]{9}-\sqrt[4]{9}+2\sqrt[3]{5}$

16) $\sqrt[5]{2}+\sqrt[5]{64}$

d) $\sqrt[3]{54}-\sqrt[3]{16}$

17) $\dfrac{\sqrt{18}}{\sqrt{81}}$

18) $\sqrt{\dfrac{4}{7}}$

19) $\dfrac{6}{\sqrt[3]{3}}$

e) $\sqrt[3]{\dfrac{32}{18}}$

21) $\dfrac{9\sqrt{6}}{3\sqrt{2}}$

Day 2 – Exponent Review

Objective: SWBAT apply properties of exponents

PROPERTIES OF EXPONENTS:

Let a and b be real numbers and m and n be integers.

The Key Phrase : _____ SMILEY FACE

Property	Definition	Example
Product of Powers	$a^m \cdot a^n = a^{m+n}$	$x^2 \cdot x^9 =$
Power of a Power	$(a^m)^n = a^{mn}$	$(x^4)^7 =$
Power of a Product	$(a \cdot b)^m = a^m b^m$	$(7x)^2 =$
Quotient of a Powers	$\frac{a^m}{a^n} = a^{m-n} \quad a \neq 0$	$\frac{x^{13}}{x^4} =$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad b \neq 0$	$\left(\frac{2}{x}\right)^3 =$
Negative Exponent	$a^{-m} = \frac{1}{a^m} \quad a \neq 0$	$x^{-8} =$
Zero Exponent	$a^0 = 1 \quad a \neq 0$	$\left(\frac{3x^2}{xy^4}\right)^0 =$

Simplify the following expressions, leave answers in exponential form.

1. $4^3 \bullet 4^2$

2. $-3a \bullet 7a^3$

a. $\left(-6b^{11}\right)\left(b^3\right)$

4. $\left(4x^2y^3\right)\left(-xy^4\right)$

5. $\left(3^3\right)^2$

6. $2\left(3x^5\right)^2$

b. $5\left(-2w^5\right)^3$

7. $\frac{7^9}{7^5}$

8. $\frac{-3w^6x^4}{9w^5x^6}$

c. $-\frac{27a^6c^3}{9a^5b^4}$

9. 2^{-3}

10. $\left(ab^3\right)\left(2b^{-4}\right)$

11. $\frac{-12w^{-4}x^7y^3}{15w^2x^7y^{-5}z}$

12. $\left(\frac{6ab^3}{\left(4a^3b\right)^2}\right)^2$

13. -3^4

Day 3 – Rational Exponents Review

Objective: **SWBAT Review properties of Rational Exponents**

RATIONAL EXPONENTS

Let a be a real number and let a and b be positive integers with n > 1.

$$x^{\frac{a}{b}} \rightarrow \frac{power}{root} = \sqrt[b]{x^a} = \left(\sqrt[b]{x}\right)^a$$

The two things you CANNOT have when rationalizing exponents are _____ and _____ in your answer.

Rewrite in radical form and simplify.

1) $9^{\frac{1}{2}}$ **2)** $27^{\frac{1}{3}}$ **3)** $32^{\frac{1}{2}}$ **a)** $16^{\frac{1}{4}}$ **4)** $-4^{\frac{1}{2}}$ **5)** $(-64)^{\frac{1}{2}}$

Radical Form	Radical Form	Radical Form	Radical Form	Radical Form	Radical Form

Simplify	Simplify	Simplify	Simplify	Simplify	Simplify

Absolute Value Rule for Variables			
Absolute Value Bars needed	$(w^6)^{1/2} =$	**Absolute Value Bars aren't needed**	$(w^6)^{1/3} =$

6) $\left(20m^6\right)^{\frac{1}{2}}$ **7)** $\left(225x^8\right)^{\frac{1}{2}}$ **8)** $\left(-8k^3\right)^{\frac{1}{3}}$ **b)** $\left(64w^{10}y^4z^{17}\right)^{\frac{1}{5}}$

Radical Form	Radical Form	Radical Form	Radical Form

Simplify	Simplify	Simplify	Simplify

Absolute Value Variable Check	Absolute Value Variable Check	Absolute Value Variable Check	Absolute Value Variable Check

Should I Root First or Power First when a≠1?

9) $25^{\frac{3}{2}}$ **10)** $\left(4p^{10}\right)^{\frac{5}{2}}$ **11)** $8^{\frac{4}{3}}$ **c)** $(27)^{\frac{2}{3}}$

Radical Form	Radical Form	Radical Form	Radical Form

Simplify	Simplify	Simplify	Simplify

12) $2^{\frac{3}{2}}$ **13)** $\left(4n^{2}\right)^{\frac{2}{3}}$ **14)** $-3x^{\frac{4}{2}}$ **15)** $(-3)^{\frac{3}{2}}$

<u>Rewrite in exponential form.</u>

19) $\left(\sqrt{6x}\right)^{5}$ **20)** $\sqrt[3]{7^{8}}$ **21)** $\sqrt{8}$ **d)** $\sqrt[3]{9}$

Day 4 – Operations with Rational Exponents

Objective: **SWBAT Apply properties of Rational Exponents**

Fraction Review: Rewrite the following fractions in mixed number form.

1. $\frac{15}{4}$ **2.** $\frac{12}{6}$ **a.** $\frac{9}{2}$

Property	Definition
Product of Powers	$a^m \cdot a^n = a^{m+n}$
Power of a Power	$(a^m)^n = a^{mn}$
Power of a Product	$(a \cdot b)^m = a^m b^m$
Quotient of a Powers	$\frac{a^m}{a^n} = a^{m-n} \quad a \neq 0$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad b \neq 0$
Negative Exponent	$a^{-m} = \frac{1}{a^m} \quad a \neq 0$
Zero Exponent	$a^0 = 1 \quad a \neq 0$
Rational Exponent	$a^{m/n} = \sqrt[n]{a^m}$

Mixed Number Concept for Rational Exponents	
Example	$2^{\frac{17}{5}}$
Write your exponent as a mixed number fraction:	
Big Number Means	**Leftover Fraction means**
Simplify	
Answer	

Simplify. Write your answers in exponential form and radical from.

1) $2^{\frac{1}{5}} \bullet 2^{\frac{3}{5}}$

2) $\left(7^{\frac{1}{6}}\right)^4$

E Form: _____

R Form: _____

E Form: _____

R Form: _____

3) $\dfrac{3^{\frac{5}{8}}}{3^{\frac{1}{8}}}$

E Form: _____

R Form: _____

b) $\left(5^{\frac{2}{3}}\right)^{3}$

E Form: _____

R Form: _____

4) $\left(y^{4}\right)^{\frac{2}{3}}$

E Form: _____

R Form: _____

5) $x^{\frac{5}{7}} \bullet x^{\frac{5}{14}}$

E Form: _____

R Form: _____

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

E Form: _____

R Form: _____

c) $9^{\frac{1}{2}} \bullet 9^{\frac{3}{4}}$

E Form: _____

R Form: _____

7) $\left(\dfrac{27x^{8}y^{12}}{x^{2}y^{9}}\right)^{\frac{1}{3}}$

E Form: _____

R Form: _____

8) $\sqrt{2} \bullet \sqrt[3]{2}$

E Form: _____

R Form: _____

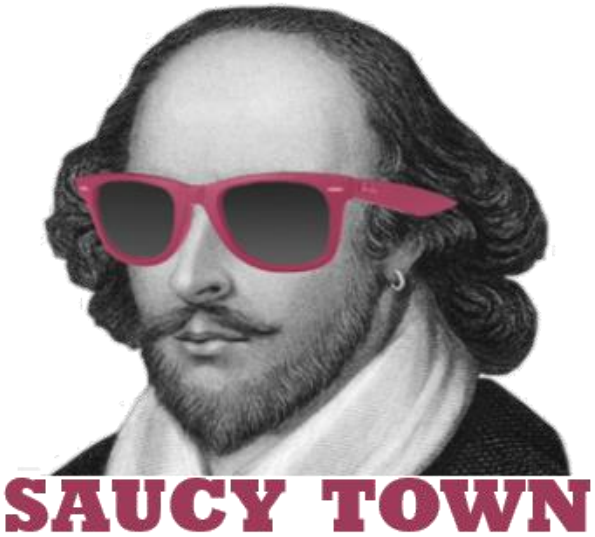
Unlike Bases

9) $\left(7^{\frac{2}{3}} \bullet 5^{\frac{1}{6}}\right)^{3}$

10) $2^{\frac{1}{3}} \bullet 4^{\frac{1}{3}}$

d) $25^{\frac{1}{2}} \bullet 5^{\frac{3}{4}}$

Day 5 – Operations with Rational Exponents – Saucy Town



Simplify. Write your answers in exponential form and radical from.

Same Base

1) $5^{\frac{3}{2}} \bullet 5^{\frac{1}{2}}$

2) $\left(6^{\frac{2}{3}}\right)^{\frac{1}{2}}$

3) $\dfrac{7}{7^{-\frac{4}{5}}}$

4) $\dfrac{11^{\frac{2}{5}}}{11^{\frac{4}{5}}}$

5) $\dfrac{9^{\frac{1}{2}}}{9^{-\frac{3}{4}}}$

Property	Definition
Product of Powers	$a^m \cdot a^n = a^{m+n}$
Power of a Power	$(a^m)^n = a^{mn}$
Power of a Product	$(a \cdot b)^m = a^m b^m$
Quotient of a Powers	$\dfrac{a^m}{a^n} = a^{m-n} \quad a \neq 0$
Power of a Quotient	$\left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m} \quad b \neq 0$
Negative Exponent	$a^{-m} = \dfrac{1}{a^m} \quad a \neq 0$
Zero Exponent	$a^0 = 1 \quad a \neq 0$
Rational Exponent	$a^{m/n} = \sqrt[n]{a^m}$

Unlike Bases

Property	Definition
Product of Powers	$a^m \cdot a^n = a^{m+n}$
Power of a Power	$(a^m)^n = a^{mn}$
Power of a Product	$(a \cdot b)^m = a^m b^m$
Quotient of a Powers	$\frac{a^m}{a^n} = a^{m-n} \quad a \neq 0$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad b \neq 0$
Negative Exponent	$a^{-m} = \frac{1}{a^m} \quad a \neq 0$
Zero Exponent	$a^0 = 1 \quad a \neq 0$
Rational Exponent	$a^{m/n} = \sqrt[n]{a^m}$

5) $3^{\frac{1}{4}} \bullet 27^{\frac{1}{5}}$

6) $3^{\frac{1}{4}} \bullet 27^{\frac{1}{4}}$

Unlike Bases – Same Roots

7) $3^{\frac{1}{4}} \bullet 25^{\frac{1}{4}}$

8) $\left(12^{\frac{3}{5}} \bullet 8^{\frac{3}{5}}\right)^5$

9) $\frac{80^{\frac{1}{4}}}{5^{-\frac{1}{4}}}$

10) $\left(\frac{7^3}{4^3}\right)^{-\frac{1}{3}}$

11) $5^{-\frac{2}{3}}$

Day 6 – Solve Exponential Equations

Objectives: **SWBAT solve equations with Exponents on both sides**

Exponential Equation

PROPERTY OF EQUALITY FOR EXPONENTIAL EQUATIONS

SAME BASE SMILEY FACE

1) $10^{x-3} = 10^{2x-1}$

2) $25^{2x-7} = 25$

a) $4^{2x+6} = 4^{3x-4}$

Change One Base

$2^0 = 1$	$3^0 = 1$	$4^0 = 1$	$5^0 = 1$
$2^1 = 2$	$3^1 = 3$	$4^1 = 4$	$5^1 = 5$
$2^2 = 4$	$3^2 = 9$	$4^2 = 16$	$5^2 = 25$
$2^3 = 8$	$3^3 = 27$	$4^3 = 64$	$5^3 = 125$
$2^4 = 16$	$3^4 = 81$	$4^4 = 256$	$5^4 = 625$
$2^5 = 32$	$3^5 = 243$	$4^5 = 1024$	$5^5 = 3125$

3) $2^x = 8$

4) $16^x = 2^{x+2}$

5) $7^x = 49^{x+4}$

b) $3^{4x} = 27$

Change Both Bases

8) $16^{x} = 8^{2x}$

9) $27^{x-2} = 81^{x+3}$

11) $125^{x} = 25^{x^2}$

c) $64^{6-x} = 4^{x^2}$

Systems of Equations

13) $y = 4$ and $y = 2^{3x-1}$

14) $y = 16^{x}$ and $y = 8^{x+2}$

15) $y = 27^{x+2}$ and $y = 81^{5-x}$

Solving Systems of Equations by Graphing:

16) $y = 16$ and $y = 3^x - 11$

c) $y = 4^x$ and $y = 2^{x+2}$