Alg. 2 – Radical and Exponent Notes
Day 1 – Evaluating Square Roots and Cube Roots

Objectives: Rewrite expressions involving radicals and rational exponents using the properties of exponents

Perfect Squares:

$1^2 =$	$6^2 =$	$11^2 =$	$16^2 =$
$2^2 =$	$7^2 =$	$12^2 =$	$17^2 =$
$3^2 =$	$8^2 =$	$13^2 =$	$18^2 =$
$4^2 =$	$9^2 =$	$14^2 =$	$19^2 =$
$5^2 =$	$10^2 =$	$15^2 =$	$20^2 =$

Perfect Cubes:

$1^3 =$

$2^3 =$

$3^3 =$

$4^3 =$

$5^3 =$

Evaluating radicals

1) $\sqrt{64}$

2) $-\sqrt{36}$

3) $\pm\sqrt{49}$

4) $\sqrt{-4}$

9) $\sqrt[3]{64}$

10) $\sqrt[3]{8}$

11) $\sqrt[3]{-27}$

12) $\sqrt[3]{343}$

Approximate the value of the radical by listing the two integers that the radical lies between.

13) $\sqrt{18}$

14) $\sqrt{7}$

15) $\sqrt[3]{36}$

Approximate the radical to the nearest integer.

19) $\sqrt{23}$

20) $\sqrt[3]{100}$

Evaluate the following expression if x = 64

22) $5\sqrt{x}$

23) $\sqrt[3]{x} + x$

Day 2 – Simplifying Radical Expressions

Objectives: Rewrite expressions involving radicals and rational exponents using the properties of exponents

Simplify the following radicals.

1) $\sqrt{12}$

2) $\sqrt{18}$

3) $\sqrt{48}$

4) $\sqrt{324}$

5) $\sqrt[3]{40}$

6) $\sqrt[3]{72}$

Multiplying Radical Expressions

Simplify the following radical expressions.

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

8) $2\sqrt{6} \bullet 3\sqrt{3}$

9) $\sqrt{6} \bullet \sqrt{5}$

10) $(4\sqrt{3})^2$

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

12) $\sqrt[3]{15} \bullet \sqrt[3]{25}$

Day 3 - Adding and Subtracting Radical Expressions

Objectives: Rewrite expressions involving radicals and rational exponents using the properties of exponents

Simplify the following radical expressions.

1) $5\sqrt{3} - 8\sqrt{3} + \sqrt{3}$

2) $\sqrt{12} - \sqrt{48}$

3) $\left(13 + \sqrt{2}\right) - \left(7 - 3\sqrt{2}\right)$

4) $\sqrt{6}\left(2 - \sqrt{3}\right)$

5) $\sqrt[3]{24} + \sqrt[3]{81}$

6) $\left(\sqrt{3} - 4\right)^2$

7) $\left(\sqrt{5} - 2\right)\left(\sqrt{5} + 2\right)$

Day 4 – Dividing Radical Expressions

Objectives: Rewrite expressions involving radicals and rational exponents using the properties of exponents

Division property of radicals:

1) $\sqrt{\dfrac{9}{4}}$

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

3) $\dfrac{\sqrt{32}}{\sqrt{2}}$

4) $\sqrt[3]{\dfrac{1}{27}}$

5) $\dfrac{\sqrt[3]{128}}{\sqrt[3]{8}}$

Rationalizing the denominator:

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

7) $\dfrac{\sqrt{5}}{\sqrt{6}}$

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

9) $\dfrac{5}{\sqrt[3]{2}}$

10) $\sqrt[3]{\dfrac{2}{5}}$

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

12) $\sqrt{\dfrac{64}{28}}$

13) $\dfrac{\sqrt{50}}{5\sqrt{3}}$

14) $\dfrac{4}{\sqrt{3}+1}$

Day 5 – Perform Operations with Complex Numbers (Day 1)

Objectives: Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real

Imaginary unit i -

Complex numbers -

Imaginary number -

Simplify the following square roots.

1) $\sqrt{-144}$

2) $\sqrt{-8}$

3) $\sqrt[3]{-64}$

Solve the following equations using square roots.

4) $x^2 = -81$

5) $x^2 + 15 = 5$

6) $2x^2 + 11 = -37$

SUMS AND DIFFERENCES OF COMPLEX NUMBERS

To add (or subtract) two complex numbers, add (or subtract) their _____ parts and their _____ parts separately.

Simplify the following complex expressions.

7) $(7 + 2i) + (2 + 8i)$

8) $(4 + 3i) - (2 - 8i)$

Day 6 – Perform Operations with Complex Numbers (Day 2)

Objectives: Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers

MULITPLYING COMPLEX NUMBERS

$i^1 = i$

$i^2 = i \bullet i =$

$i^3 = i \bullet i \bullet i = i^2 \bullet i =$

$i^4 = i \bullet i \bullet i \bullet i = i^2 \bullet i^2 =$

$i^5 = i \bullet i \bullet i \bullet i \bullet i = i \bullet i^4 =$

$i^1 = \underline{\hspace{2cm}}$ $i^2 = \underline{\hspace{2cm}}$ $i^3 = \underline{\hspace{2cm}}$ $i^4 = \underline{\hspace{2cm}}$

$i^5 = \underline{\hspace{2cm}}$ $i^6 = \underline{\hspace{2cm}}$ $i^7 = \underline{\hspace{2cm}}$ $i^8 = \underline{\hspace{2cm}}$

$i^{27} = \underline{\hspace{2cm}}$

Simplify the following complex expressions.

1) $-6(2 - 3i)$

2) $(1 - 4i)(2 - 8i)$

3) $(4 - i)(3 + 2i)$

Complex Conjugates -

Find the product of the following complex conjugates.

4) $(3 + 9i)(3 - 9i)$

Simplify each expression.

8) $\dfrac{5 - 6i}{-3i}$

9) $\dfrac{1 + i}{3 - 2i}$

Day 7 – Exponents and Multiplying Monomials

Objectives: Use properties of exponents to simplify expressions.

Evaluating powers

1) 3^4 **2)** $\left(\dfrac{1}{2}\right)^3$ **3)** $(-2)^4$ **4)** $(-5)^3$ **5)** -6^2

Product of Powers:

Simplify the following expressions. Leave answers in exponential form.

6) $x^3 \bullet x^5$ **7)** $y \bullet y^4$ **8)** $4^3 \bullet 4^2$ **9)** $x^3 \bullet y^4$

10) $\left(a^3 b^2\right)\left(a^3 b^4\right)$ **11)** $n^3 \bullet m^2 n$ **12)** $(-9)^2 (-9)^3$ **13)** $x^{\frac{1}{2}} \bullet x^{\frac{3}{2}}$

Multiply the following expressions. Leave answers in exponential form.

14) $\left(8m^6\right)\left(4m^2\right)$ **15)** $\left(\dfrac{2}{3}x^4\right)\left(\dfrac{3}{4}x^5\right)$ **16)** $8^2 \bullet 8^7$ **17)** $\left(4m^{\frac{1}{3}}\right)\left(-2m^{\frac{5}{3}}\right)$

18) $-b\left(-a^3 b\right)$ **19)** $-4\left(j^2\right)\left(3jk^3\right)$ **20)** $-2ab\left(-b^3\right)(-5ac)$ **20)** $-2^2 \bullet 2^6$

Day 8 – Power of a Power and Power of a Product

Objectives: Use properties of exponents to simplify expressions.

Power of a power property:

1) $\left(2^3\right)^2$

2) $\left(x^4\right)^3$

3) $\left(y^3\right)^{5x}$

Power of a product property:

4) $\left(a^3b^2\right)^2$

5) $\left(-m^7n\right)^8$

6) $\left(3y^6\right)^2\left(-x^5y^2z\right)^3$

7) $-y^4$

Quotient of a Power and Power of a Quotient

Quotient of a power property:

8) $\dfrac{y^4}{y}$

9) $\dfrac{7^9}{7^5}$

10) $\dfrac{-3w^6x^4}{9w^5x^6}$

Power of a quotient property

11) $\left(\dfrac{x^4}{y^2}\right)^3$

12) $\left(\dfrac{4m^2}{12n^5}\right)^4$

13) $\left(\dfrac{6ab^3}{\left(4a^3b\right)^2}\right)^2$

Negative and Zero Exponents

Definition of a negative exponent:

14) 2^{-3}

15) $3^5 \bullet 3^{-9}$

16) $\dfrac{1}{6^{-2}}$

Simplify the following expressions and write answers _without_ negative exponents.

17) $\left(ab^3\right)\left(a^2b^{-4}\right)$

18) $\dfrac{-12w^{-4}x^3z^4}{15w^2x^{-5}z^4}$

19) Evaluate: 9^0