# **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:				Perfect Cubes:
$1^2 =$	$6^2 =$	$11^2 =$	$16^2 =$	$1^3 =$
$2^2 =$	$7^2 =$	$12^2 =$	$17^2 =$	$2^{3} =$
$3^2 =$	$8^2 =$	$13^2 =$	$18^2 =$	$3^3 =$
$4^2 =$	$9^2 =$	$14^2 =$	$19^2 =$	$4^3 =$
$5^2 =$	$10^2 =$	$15^2 =$	$20^2 =$	$5^3 =$
<b>Evaluating radicals</b> <b>1</b> ) $\sqrt{64}$	<b>2</b> ) −√36		<b>3</b> ) ±√49	<b>4</b> ) √-4
<b>9</b> ) <sup>3</sup> √64	<b>10</b> ) ∛8		<b>11</b> ) <sup>3</sup> √-27	<b>12</b> ) <sup>3</sup> √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.

<b>1</b> ) $\sqrt{12}$	<b>2</b> ) $\sqrt{18}$	<b>3</b> ) $\sqrt{48}$
<b>4</b> ) √324	<b>5</b> ) <sup>3</sup> √40	<b>6</b> ) ∛72

## **Multiplying Radical Expressions**

Simplify the following radical expressions.

7)	$\sqrt{6} \bullet \sqrt{12}$	<b>8</b> ) $2\sqrt{6} \cdot 3\sqrt{3}$	9) $\sqrt{6} \bullet \sqrt{5}$
_ / )	$\sqrt{0}$ $\sqrt{12}$	$2\sqrt{0} - 3\sqrt{3}$	$\mathbf{y} = \mathbf{y}$

<b>10</b> ) $(4\sqrt{3})^2$ <b>15</b> ) $\sqrt[3]{4} \cdot \sqrt[3]{12}$ <b>12</b> ) $\sqrt[3]{15} \cdot \sqrt[3]{15}$	10)
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# **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**) 
$$(13+\sqrt{2})-(7-3\sqrt{2})$$
 **4**)  $\sqrt{6}(2-\sqrt{3})$ 

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

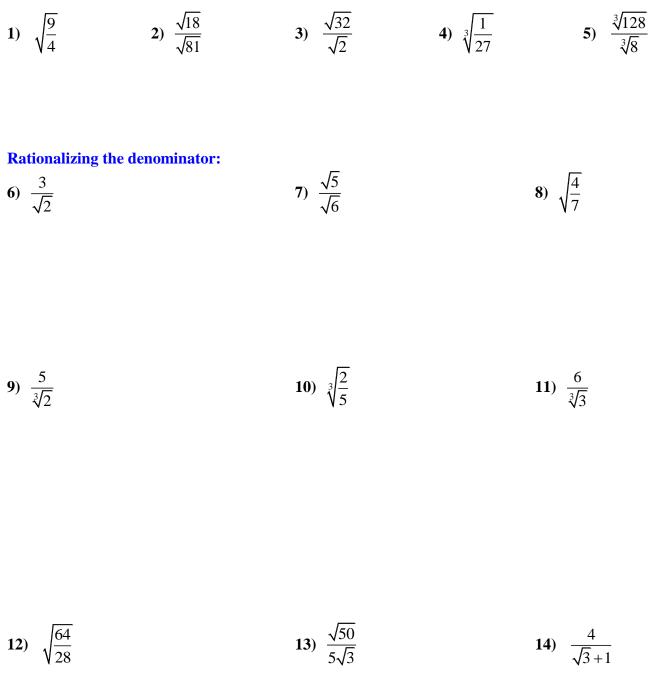
**6**) 
$$(\sqrt{3}-4)^2$$

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

# **Day 4 – Dividing Radical Expressions**

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





## **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>i</i> -		Complex num	nbers -
Imaginary number -			
Simplify the following square root	<u>s.</u>		
<b>1</b> ) $\sqrt{-144}$	<b>2</b> ) $\sqrt{-8}$		<b>3</b> ) <sup>3</sup> √-64
Solve the following equations usin	g 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.

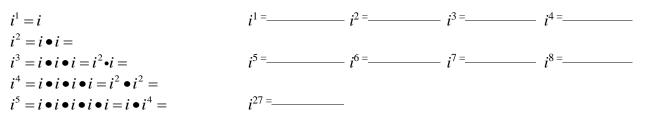
## Simplify the following complex expressions.

**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



#### Simplify the following complex expressions.

<b>1</b> ) $-0(2-3i)$ <b>2</b> ) $(1-4i)(2-6i)$ <b>3</b> ) $(4-i)(3+i)$	<b>1</b> ) $-6(2-3i)$	<b>2</b> ) $(1-4i)(2-8i)$	<b>3</b> ) $(4-i)(3+2i)$
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#### **Complex Conjugates -**

#### Find the product of the following complex conjugates.

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

#### Simplify each expression.

8)	5-6i	<b>o</b> ) <sup>1</sup>	+i
0)	-3i	$\frac{3}{3}$	-2i

# Day 7 – Exponents and Multiplying Monomials

**Objectives:** Use properties of exponents to simplify expressions.

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

## **Product of Powers:**

Simplify the followi	ing expressions. Leave ansv	vers in exponential form.	
<b>6</b> ) $x^3 \bullet x^5$	$7)  y \bullet y^4$	<b>8</b> ) $4^3 \bullet 4^2$	<b>9</b> ) $x^3 \bullet y^4$

**10**) 
$$(a^{3}b^{2})(a^{3}b^{4})$$
 **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)**  $(8m^6)(4m^2)$  **15)**  $\left(\frac{2}{3}x^4\right)\left(\frac{3}{4}x^5\right)$  **16)**  $8^2 \cdot 8^7$  **17)**  $\left(4m^{\frac{1}{3}}\right)\left(-2m^{\frac{5}{3}}\right)$ 

**18**) 
$$-b(-a^{3}b)$$
 **19**)  $-4(j^{2})(3jk^{3})$  **20**)  $-2ab(-b^{3})(-5ac)$  **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**) 
$$(2^3)^2$$
 **2**)  $(x^4)^3$  **3**)  $(y^3)^{5x}$ 

**Power of a product property:** 

**4)**  $(a^{3}b^{2})^{2}$  **5)**  $(-m^{7}n)^{8}$  **6)**  $(3y^{6})^{2}(-x^{5}y^{2}z)^{3}$  **7)**  $-y^{4}$ 

## **Quotient of a Power and Power of a Quotient**

Qu	otient of a power property:				
8)	$\frac{y^4}{y}$	9)	$\frac{7^9}{7^5}$	10)	$\frac{-3w^6x^4}{9w^5x^6}$

## Power of a quotient property

**11**) 
$$\left(\frac{x^4}{y^2}\right)^3$$
 **12**)  $\left(\frac{4m^2}{12n^5}\right)^4$  **13**)  $\left(\frac{6ab^3}{(4a^3b)^2}\right)^2$ 

## **Negative and Zero Exponents**

# Definition of a negative exponent:14) $2^{-3}$ 15) $3^5 \bullet 3^{-9}$

Simplify the following expressions and write answers *without* negative exponents.

<b>17</b> ) (al	$(b^3)(a^2b^{-4})$	<b>18</b> )	$\frac{-12w^{-4}x^3z^4}{15w^2x^{-5}z^4}$	<b>19</b> )	Evaluate:	<b>9</b> <sup>0</sup>
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16)  $\frac{1}{6^{-2}}$