

Name \_\_\_\_\_  
Date \_\_\_\_\_

MTH 104 - Intermediate Algebra  
Class #30

### Final Review Topics

#### Section 1. Rational Exponents and Simplification of Expressions.

1. Make a "list of" Perfect:

	1	2	3	4	5	6	7	8	9	10
Squares	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Cubes	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Fourths	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Fifths	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

2. Simplify:

$(125)^{1/3}$	_____	$(16)^{3/2}$	_____	$(32x^5y^{10})^{3/5}$	_____
$(243)^{1/5}$	_____	$(27)^{2/3}$	_____	$(9x^4y^8)^{3/2}$	_____
$(81)^{1/2}$	_____	$(81)^{5/4}$	_____	$(125a^6b^9)^{2/3}$	_____
$(625)^{1/4}$	_____	$(32)^{6/5}$	_____	$(16a^8b^{20})^{3/4}$	_____

3. Simplify The Radical Expressions:

a. $\sqrt{28}$	_____	b. $\sqrt{45}$	_____
	_____		_____
c. $\sqrt[3]{24}$	_____	d. $\sqrt[4]{162}$	_____
	_____		_____
e. $\sqrt{a^{11}b^8}$	_____	f. $\sqrt[3]{x^{12}y^{17}}$	_____
	_____		_____

g.  $\sqrt[3]{-54a^{10}b^{12}}$  \_\_\_\_\_  
\_\_\_\_\_

h.  $\sqrt{-75a^7b^{11}}$  \_\_\_\_\_  
\_\_\_\_\_

**Section 2. Complex Numbers**

4. Multiply each expression by its Conjugate.

a.  $\sqrt{5} + 2$  \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b.  $2i - 3$  \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Simplify the Following Rational Expressions:

a.  $\frac{6}{2-i}$

b.  $\frac{9}{5+i}$

c.  $\frac{13}{-3-4i}$

d.  $\frac{4}{6-\sqrt{-4}}$

6. Solve with Imaginary Numbers.

a.  $\sqrt{-9}(6+11i)$

b.  $(7 + \sqrt{-2})(5 - \sqrt{-8})$

c.  $(\sqrt{3} + 2i)(\sqrt{6} - \sqrt{-8})$

**Section 3. Sum and Difference of Perfect Cubes**

7. Write the general form for the sum of cubes:

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Write the general form for the difference of cubes:

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a. Factor:  $a^3 + 27$

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b. Factor:  $8x^3 - 125$

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8. Simplify The Radical Expressions:

a.  $\frac{8x^3 - 1}{4x^2 + 2x + 1} \cdot \frac{a^2 - 2a + 1}{(a - 1)^2}$

b.  $\frac{a^2 - 16}{a^3 - 64} \div \frac{a^2 + 8a + 16}{a^2 + 4a + 16}$

Section 4. Rational Expressions - Write with Positive Exponents Only.

9. Simplify the Following:

a.  $\left(\frac{7x^{-2}}{xy}\right)^{-2}$

b.  $\left(\frac{10x^2y}{5xz}\right)^{-3}$

Section 5. Solve the Problem:

10. A chemist has both 6% and 15% lithium citrate solutions. He wishes to make 0.5 liters of an 8% lithium citrate solution. How much of each solution ingredient need to be used?

Ingredient	Amount	% age	Total

11. After Lisa received a \$5000 bonus at work, she invested some of the money in a money-market account yielding 3.5% simple interest and the rest in a certificate of deposit that paid a 4% simple interest. If the total amount of the interest that Lisa earned for the year was \$187.15. Determine the amount of interest earned from each account.