**Big Bend Community College**

**Intermediate Algebra**

**MPC 099**

**Lab Notebook**

[Description: Creative Commons License](http://creativecommons.org/licenses/by/3.0/)  
Intermediate Algebra Lab Notebook by Tyler Wallace is licensed under a Creative Commons Attribution 3.0 Unported License. Permissions beyond the scope of this license may be available at http://wallace.ccfaculty.org/book/book.html.

**Table of Contents**

**Module A: Compound Inequalities and Systems of Equations 3**

**Module B: Radicals 27**

**Module C: Quadratics 51**

**Module D: Rational Equations 80**

**Module E: Functions 95**

**MPC 099 Module A:   
Compound Inequalities and   
Systems of Equations**

Compound Inequalities - AND

|  |  |
| --- | --- |
| Compound Inequality:  AND:  Solving Inequalities is just like solving \_\_\_\_\_\_\_\_\_\_\_\_\_, just be sure to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when we   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  AND | Example B  AND |
| Practice A | Practice B |

Compound Inequalities - OR

|  |  |
| --- | --- |
| OR:  Don't forget to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  To represent two parts of a graph in interval notation we use \_\_\_\_ | |
| Example A  OR | Example B  OR |
| Practice A | Practice B |

Compound Inequalities - Tripartite

|  |  |
| --- | --- |
| Tripartite Inequalities:  Be sure when solving to balance on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Absolute Value Inequalities - Simple

|  |  |
| --- | --- |
| Absolute Value:  Consider: | |
| Example A | Example B |
| Practice A | Practice B |

Absolute Value Inequalities - Solving

|  |  |
| --- | --- |
| To solve we first set up a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then \_\_\_\_\_\_\_\_\_\_ it! | |
| Example A | Example B |
| Practice A | Practice B |

Absolute Value Inequalities - Isolate Absolute

|  |  |
| --- | --- |
| Before we can set up a compound inequality, we must first \_\_\_\_\_\_\_\_\_\_\_\_\_ the absolute value!  Beware: with absolute value we cannot \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Introduction to Substitution

|  |  |
| --- | --- |
| System of Equations: Several \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and several \_\_\_\_\_\_\_\_\_\_\_\_ working \_\_\_\_\_\_\_\_\_\_\_\_\_\_  The solution to a system of equations is given as an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ written \_\_\_\_\_\_\_  Substitution: replace the \_\_\_\_\_\_\_\_\_\_\_\_ with what it \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Substitute Expression

|  |  |
| --- | --- |
| Just as we can replace a variable with a number, we can also replace it with an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Whenever we substitute it is important to remember \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Solve for a Variable

|  |  |
| --- | --- |
| To use substitution we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a lone variable  If there are several lone variables \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Substitution with Special Cases

|  |  |
| --- | --- |
| If the variables subtract out to zero then it means either    there is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Addition

|  |  |
| --- | --- |
| If there is no lone variable, it may be better to use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  This method works by adding the \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ sides of the equations together! | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Addition with Multiplication

|  |  |
| --- | --- |
| Addition only works if one of the variables have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  To get opposites we can multiply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an equation to get the values we want!  Be sure when multiplying to have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in front of a variable. | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Multiplying Two Equations

|  |  |
| --- | --- |
| Sometimes we may have to multiply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by something to get opposites  The opposite we look for is the \_\_\_\_\_\_\_\_\_\_ of both coefficients. | |
| Example A | Example B |
| Practice A | Practice B |

Systems of Equations - Special Cases with Addition

|  |  |
| --- | --- |
| If the variables subtract out to zero then it means either    there is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Systems of 3 Variables - Simple

|  |  |
| --- | --- |
| To solve systems with three variables we must \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  This will give us \_\_\_\_\_\_ equations with \_\_\_\_\_\_\_\_ variables we can then solve for! | |
| Example A | Example B |
| Practice A | Practice B |

3 Variables - Multiplying to Eliminate Variables

|  |
| --- |
| To eliminate a variable, we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ one or more equations to get \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A |
| Practice A |

Value/Interest Problems - Value with 1 Variable

|  |  |
| --- | --- |
| Value Table:  The equation always comes from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  Brian has twice as many dimes as quarters. If the value of the coins is $4.95, how many of each does he have? | Example B  A child has three more nickels than dimes in her piggy-bank. If she has $1.95 in the bank, how many of each does she have? |
| Practice A | Practice B |

Value/Interest Problems - Interest with 1 Variable

|  |  |
| --- | --- |
| Interest Table:  The equation always comes from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  Sophia invested $1900 in one account and $1500 in another account that paid 3% higher interest rate. After one year she had earned $113 in interest. At what rates did she invest? | Example B  Carlos invested $2500 in one account and $1000 in another which paid 4% lower interest. At the end of a year he had earned $345 in interest. At what rates did he invest? |
| Practice A | Practice B |

Value/Interest Problems - Value with 2 Variables

|  |  |
| --- | --- |
| With two variables the equations will come from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ columns. | |
| Example A  Scott has $2.15 in his pocket made up of eleven quarters and dimes. How many of each coin does he have? | Example B  If 105 people attended a concert and tickets for adults cost $2.50 while tickets for children cost $1.75 and total receipts for the concert were $228, how many children and how many adults went to the concert? |
| Practice A | Practice B |

Value/Interest - Interest with 2 Variables

|  |  |
| --- | --- |
| With two variables the equations will come from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ columns. | |
| Example A  A woman invests $4600 in two different accounts. The first paid 13%, the second paid 12% interest. At the end of the first year she had earned $586 in interest. How much was in each account? | Example B  A bank loaned out $4900 to two different companies. The first loan had a 4% interest rate; the second had a 13% interest rate. At the end of the first year the loan had accrued $421 in interest. How much was loaned at each rate? |
| Practice A | Practice B |

Mixture Problems - Known Starting Amount

|  |  |
| --- | --- |
| Mixture Table:  The equation always comes from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  A store owner wants to mix chocolate an nuts to make a new candy. How many pounds of chocolate costing $8.50 per pound should be mixed with 25 pounds of nuts that cost $2.50 per pound to make a mixture worth $4.33 per pound? | Example B  You need a 55% alcohol solution. On hand, you have 600 mL of 10% alcohol mixture. You also have a 95% alcohol mixture. How much of the 95% mixture should you add to obtain your desired solution? |
| Practice A | Practice B |

Mixture - Unknown Starting Amount

|  |  |
| --- | --- |
| With two variables the equations will come from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ columns. | |
| Example A  A chemist needs to create 100 mL of a 38% acid solution. On hand she has a 20% acid solution and a 50% acid solution. How many mL of each should she use? | Example B  A coffee distributor needs to mix a coffee blend that normally sells for $8.90 per pound with another coffee blend that normally sells for $11.30 per pound. If the distributor wishes to create 70 pounds of coffee that can sell for $11.16 per pound, how many pounds of each kind of coffee should the mix? |
| Practice A | Practice B |

Mixture - Pure Solutions

|  |  |
| --- | --- |
| The percentage of acid (or other chemical) in pure acid is \_\_\_\_\_\_\_\_  The percentage of acid (or other chemical) in water is \_\_\_\_\_\_\_\_ | |
| Example A  You need 1425 mL of 10% alcohol solution. On hand you have a 5% alcohol mixture and pure alcohol. How much of each should you use? | Example B  You need a 60% methane solution. On hand you have 180 mL of an 85% methane solution. How much water will you need to add to obtain the desired solution? |
| Practice A | Practice B |

**MPC 099 Module B:   
Radicals**

Simplify Radicals - Prime Factorization

|  |  |
| --- | --- |
| Prime Factorization:  To find a prime factorization we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  A few prime numbers: | |
| Example A | Example B |
| Practice A | Practice B |

Simplify Radicals - Perfect Roots

|  |  |
| --- | --- |
| Roots: where is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Roots of an expression with exponents: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Simplify Radicals - Not Perfect Radicals

|  |  |
| --- | --- |
| To take roots we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      When we divide if there is a remainder, the remainder \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Simplify Radicals - With Coefficients

|  |  |
| --- | --- |
| If there is a coefficient on the radical: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by what \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Simplify Radicals - Variables

|  |  |
| --- | --- |
| Variables in Radicals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Remainders \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - Adding Like Radicals

|  |  |
| --- | --- |
| Simplify:  Simplify:  When adding and subtracting radicals we can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - Simplify and Add

|  |  |
| --- | --- |
| Before adding radicals together \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - Multiply Monomials

|  |  |
| --- | --- |
| Product Rule:  Always be sure your final answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - Distributing with Radicals

|  |  |
| --- | --- |
| Recall:  Always be sure your final answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - FOIL with Radicals

|  |  |
| --- | --- |
| Recall:  Always be sure your final answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - Conjugates

|  |  |
| --- | --- |
| Recall:  Always be sure your final answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Add/Subtract/Multiply - Perfect Square

|  |  |
| --- | --- |
| Recall:  Always be sure your final answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Rationalize Denominators - Simplifying with Radicals

|  |  |
| --- | --- |
| Expressions with Radicals: Always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first  Before \_\_\_\_\_\_\_\_\_\_\_\_\_\_ with fractions, be sure to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first | |
| Example A | Example B |
| Practice A | Practice B |

Rationalize Denominators - Quotient Rule

|  |  |
| --- | --- |
| Quotient Rule:  Often it is helpful to reduce the \_\_\_\_\_\_\_\_\_\_\_\_ first, then reduce the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Rationalize Denominators - Monomial Square Root

|  |  |
| --- | --- |
| Rationalize Denominators: No \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  To clear radicals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by extra needed factors in denominator (multiply by same on top!)  It may be helpful to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ first (both \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_) | |
| Example A | Example B |
| Practice A | Practice B |

Rationalize Denominators - Monomial Higher Root

|  |  |
| --- | --- |
| Use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  To clear radicals: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by extra needed factors in denominator (multiply by same on top!)  Hint: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ numbers | |
| Example A | Example B |
| Practice A | Practice B |

Rationalize Denominators - Binomial Denominators

|  |  |
| --- | --- |
| What doesn’t work:  Recall:  Multiply by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Rational Exponents - Convert

|  |  |
| --- | --- |
| If we divide the exponent by the index, then  The index is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  Write as an exponent: | Example B  Write as a radical: |
| Example C  Write as a radical: | Example D  Write as an exponent |
| Practice A | Practice B |
| Practice C | Practice D |

Rational Exponents - Evaluate

|  |  |
| --- | --- |
| To evaluate a rational exponent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Rational Exponents - Simplify

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Recall Exponent Properties:   |  |  |  | | --- | --- | --- | |  |  |  | |  |  |  | |  |  |  |   To Simplify: | |
| Example A | Example B |
| Practice A | Practice B |

Mixed Index - Reduce Index

|  |  |
| --- | --- |
| Using Rational Exponents:  To reduce the index \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_  Without using rational exponents:  Hint: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ any numbers | |
| Example A | Example B |
| Practice A | Practice B |

Mixed Index - Multiply

|  |  |
| --- | --- |
| Using Rational Exponents:  Get a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Without using rational exponents:  Hint: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ any numbers  Always be sure your final answer is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Mixed Index - Divide

|  |  |
| --- | --- |
| Division with mixed index – Get a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Hint: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ any numbers  May have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

**MPC 099 Module C:   
Quadratics**

Complex Numbers – Square Roots of Negatives

|  |  |
| --- | --- |
| Define: and therefore,  Now we can calculate:  Expressions with Radicals: Always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first  Before \_\_\_\_\_\_\_\_\_\_\_\_\_\_ with fractions, be sure to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first | |
| Example A | Example B |
| Practice A | Practice B |

Complex Numbers – Add/Subtract

|  |  |
| --- | --- |
| works just like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Complex Numbers – Multiply

|  |  |
| --- | --- |
| works just like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Remember | |
| Example A | Example B |
| Example C | Example D |
| Practice A | Practice B |
| Practice C | Practice D |

Complex Numbers – Rationalize Monomials

|  |  |
| --- | --- |
| If \_\_\_\_\_\_ then we can rationalize it by just multiplying by \_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Complex Numbers – Rationalize Binomials

|  |  |
| --- | --- |
| Similar to other radicals we can rationalize a binomial by multiplying by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Radicals – Odd Roots

|  |  |
| --- | --- |
| The opposite of taking a root is to do an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  then | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Radicals – Even Roots

|  |  |
| --- | --- |
| The opposite of taking a root is to do an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  With even roots: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the original equation!  Recall: | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Radicals – Isolate Radical

|  |  |
| --- | --- |
| Before we can clear a radical it must first be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Radicals – Two Roots

|  |  |
| --- | --- |
| With two roots, first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ one root and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ both sides  Then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the term with the other root and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ both sides. | |
| Example A  (practice problems on the next page) | Example B |
| Practice A | Practice B |

Equations with Exponents – Odd Exponents

|  |  |
| --- | --- |
| The opposite of taking an exponent is to do a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  If , then | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Exponents – Even Exponents

|  |  |
| --- | --- |
| Consider: and  When we clear an even root we have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Exponents – Isolate Exponent

|  |  |
| --- | --- |
| Before we can clear an exponent it must first be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Equations with Exponents – Rational Exponents

|  |  |
| --- | --- |
| To multiply to one:  We clear a rational exponent by using a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Recall:  Recall: Check answer if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, two answer if \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Complete the Square – Find

|  |  |
| --- | --- |
| is easily factored to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  To make a perfect square, | |
| Example A  Find and factor the perfect square | Example B  Find and factor the perfect square |
| Example C  Find and factor the perfect square | Example D  Find and factor the perfect square |
| Practice A | Practice B |
| Practice C | Practice D |

Complete the Square – Rational Solutions

|  |  |
| --- | --- |
| To complete the square:   1. Separate \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. Divide by \_\_\_\_\_\_ (everything!) 3. Find \_\_\_\_\_\_ and \_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Complete the Square – Irrational and Complex Solutions

|  |  |
| --- | --- |
| If we can’t simplify the \_\_\_\_\_\_\_\_\_\_\_\_\_ we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ what we can. | |
| Example A | Example B |
| Practice A | Practice B |

Quadratic Formula – Finding the Formula

|  |
| --- |
| Solve by completing the square: |

Quadratic Formula – Using the Formula

|  |  |
| --- | --- |
| If then | |
| Example A | Example B |
| Practice A | Practice B |

Quadratic Formula – Make Equal to Zero

|  |  |
| --- | --- |
| Before using the quadratic formula, the equation must equal \_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Quadratic Formula –

|  |  |
| --- | --- |
| If a term is missing, we use \_\_\_\_\_ in the quadratic formula. | |
| Example A | Example B |
| Practice A | Practice B |

Rectangles - Area

|  |  |
| --- | --- |
| Area of a rectangle:  To help visualize the rectangle, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  The length of a rectangle is 2 ft longer than the width. The area of the rectangle is 48 . What are the dimensions of the rectangle? | Example B  The area of a rectangle is 72 . If the length is 6 cm more than the width, what are the dimensions of the rectangle? |
| Practice A | Practice B |

Rectangles - Perimeter

|  |  |
| --- | --- |
| Perimeter of a Rectangle:  Tip: Solve the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ equation for a variable. | |
| Example A  The area of a rectangle is 54 . If the perimeter is 30 meters, what are the dimensions of the rectangle? | Example B  The perimeter of a rectangle is 22 inches. If the area of the same rectangle is 24 , what are the dimensions? |
| Practice A | Practice B |

Rectangles - Bigger

|  |  |
| --- | --- |
| We may have to draw \_\_\_\_\_\_\_\_ rectangles.  Multiply/Add to the \_\_\_\_\_\_\_\_\_\_\_\_ to get the big rectangle.  Divide/Subtract to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to get the small rectangle. | |
| Example A  Each side of a square is increased 6 inches. When this happens, the area is multiplied by 16. How many inches in the side of the original square? | Example B  The length of a rectangle is 9 feet longer than it is wide. If each side is increased 9 feet, then the area is multiplied by 3. What are the dimensions of the original rectangle? |
| Practice A | Practice B |

Compound Fractions - Numbers

|  |  |
| --- | --- |
| Compound/Complex Fractions:  Clear \_\_\_\_\_\_\_\_\_\_\_\_ by multiplying each \_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_ of everything! | |
| Example A | Example B |
| Practice A | Practice B |

Compound Fractions - Monomials

|  |  |
| --- | --- |
| Recall: To find the LCD with variables, use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exponents  Be sure to check for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!!!! | |
| Example A | Example B |
| Practice A | Practice B |

Compound Fractions - Binomials

|  |  |
| --- | --- |
| The LCD could have one or more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in it! | |
| Example A | Example B |
| Practice A | Practice B |

Compound Fractions – Negative Exponents

|  |  |
| --- | --- |
| Recall:  If there is any \_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_ we can’t just \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Instead make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

**MPC 099 Module D:   
Rational Equations**

Rational Equations – Clear Denominator

|  |  |
| --- | --- |
| Recall:  Clear fractions by multiplying \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Rational Equations – Factoring Denominator

|  |  |
| --- | --- |
| To identify all the factors in the \_\_\_\_\_\_\_\_\_\_\_ we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Rational Equations – Extraneous Solutions

|  |  |
| --- | --- |
| Because we are working with fractions, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ cannot be \_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Work Problems – One Unknown Time

|  |  |
| --- | --- |
| Adam does a job in 4 hours. Each hour he does \_\_\_\_\_\_\_\_\_ of the job.  Betty does a job in 12 hours. Each hour he does \_\_\_\_\_\_\_\_\_\_\_ of the job.  Together, each hour they do \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the job.  This means it takes them, working together, \_\_\_\_\_\_\_\_ hours to do the entire job.  Work Equation: Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_! | |
| Example A  Catherine can paint a house in 15 hours. Dan can paint it in 30 hours. How long will it take them working together? | Example B  Even can clean a room in 3 hours. If his sister Faith helps, it takes them hours. How long will it take Faith working alone? |
| Practice A | Practice B |

Work Problems – Two Unknown Times

|  |  |
| --- | --- |
| Be sure to clearly identify who is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_! | |
| Example A  Tony does a job in 16 hours less time than Marissa, and they can do it together in 15 hours. How long will it take each to do the job alone? | Example B  Alex can complete his project in 21 hours less than Hillary. If they work together it can get done in 10 hours. How long does it take each working alone? |
| Practice A | Practice B |

Simultaneous Products

|  |
| --- |
| Simultaneous Product: \_\_\_\_\_\_\_ equations with \_\_\_\_\_\_\_\_ variables that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  To solve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ both by the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A |
| Practice A |

Distance/Revenue – Revenue Problems

|  |  |
| --- | --- |
| Revenue Table:  To solve: Divide by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  A group of college students bought a couch for $80. However, five of them failed to pay their share so the others had to each pay $8 more. How many students were in the original group?  (practice problems on the next page) | Example B  A merchant bought several pieces of silk for $70. He sold all but two of them at a profit of $4 per piece. His total profit was $18. How many pieces did he originally purchase? |
| Practice A | Practice B |

Distance/Revenue – Distance Problems

|  |  |
| --- | --- |
| Distance Table:  To solve: Divide by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  A man rode his bike to a park 60 miles away. On the return trip he went 2 mph slower which made the trip take 1 hour longer. How fast did he ride to the park?  (practice problems on the next page) | Example B  After driving through a construction zone for 45 miles, a woman realized that if she had driven just 6 mph faster she would have arrived 2 hours sooner. How fast did she drive? |
| Practice A | Practice B |

Distance/Revenue – Steams and Wind

|  |  |
| --- | --- |
| Downwind/stream:  Upwind/stream: | |
| Example A  Zoe rows a boat downstream for 80 miles. The return trip upstream took 12 hours longer. If the current flows at 3 mph, how fast does Zoe row in still water?  (practice problems on the next page) | Example B  Darius flies a plane against a headwind for 5084 miles. The return trip with the wind took 20 hours less time. If the wind speed is 10mph, how fast does Darius fly the plane when there is no wind? |
| Practice A | Practice B |

Frames – Picture Frames

|  |  |
| --- | --- |
| To help visualize the frame \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Remember the frame is on the \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, also the \_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ | |
| Example A  A picture measures 10 inches by 7 inches is placed in a frame of uniform width. If the area of the frame and picture together is 208 square inches, what is the width of the frame? | Example B  An 8 inch by 12 inch drawing has a frame of uniform width around it. The area of the frame is equal to the area of the picture. What is the width of the frame? |
| Practice A | Practice B |

Frames – Percent of a Field

|  |  |
| --- | --- |
| Clearly identify the area of the \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ rectangles!  Be careful with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, is it talking about the \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_? | |
| Example A  A man mows his 40 ft by 50 ft rectangular lawn in a spiral pattern starting from the outside edge. By noon he is 90% done. How wide of a strip has he cut around the outside edge? | Example B  A farmer has a 50 ft by 25 ft rectangular field that he wants to increase by 68% by cultivating a strip of uniform width around the current field. How wide of a strip should he cultivate? |
| Practice A | Practice B |

**MPC 099 Module E:   
Functions**

Functions – Definition and Vertical Line Test

|  |  |
| --- | --- |
| Function:  If it is a function we often write \_\_\_\_\_ which is read \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  A graph is a function if it passes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or each \_\_\_ has at most one \_\_\_\_\_. | |
| Example A | Example B |
| Practice A | Practice B |

Functions - Domain

|  |  |
| --- | --- |
| Domain:  Fractions:  Even Radicals: | |
| Example A | Example B |
| Practice C | Practice A |
| Practice B | Practice C |

Functions – Function Notation

|  |  |
| --- | --- |
| Function notation:  What is inside of the function notation goes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  Find | Example B  Find |
| Practice A | Practice B |

Functions – Evaluate at Expressions

|  |  |
| --- | --- |
| When replacing a variable we always use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  We can replace the variable with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  Find | Example B  Find |
| Practice A | Practice B |

Algebra of Functions – Add/Subtract/Multiply/Divide

|  |  |
| --- | --- |
| Four basic function operations: | |
| Example A | Example B |
| Practice A | Practice B |

Algebra of Functions - Composition

|  |  |
| --- | --- |
| Composition of Functions: | |
| Example A | Example B |
| Practice A | Practice B |

Inverse Functions – Showing Functions are Inverses

|  |  |
| --- | --- |
| Inverse Function:  To test if functions are inverses calculate \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ and the answer should be \_\_\_ | |
| Example A  Are they inverses? | Example B  Are they inverses? |
| Practice A | Practice B |

Inverse Functions – Find the Inverse

|  |  |
| --- | --- |
| To find an inverse function \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_ and \_\_\_, then solve for \_\_\_.  (the \_\_\_\_\_ is the y!) | |
| Example A | Example B |
| Practice A | Practice B |

Inverse Functions – Graph the Inverse

|  |  |
| --- | --- |
| Inverse functions \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_ and \_\_\_\_  Identify key \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Graph Quadratic Functions – Key Points

|  |  |
| --- | --- |
| Quadratic Equations are of the form:  Quadratic Graph: Key Points: | |
| Example A | Example B |
| Practice A | Practice B |

Exponential Equations – Common Base

|  |  |
| --- | --- |
| Exponential Functions:  Solving Exponential Functions: If the \_\_\_\_\_\_\_\_\_ are equal then the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are equal.  Recall Exponent Property: | |
| Example A | Example B |
| Practice A | Practice B |

Exponential Functions – Binomial Exponents

|  |  |
| --- | --- |
| When multiplying exponents we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Compound Interest – N Compounds

|  |  |
| --- | --- |
| Compound Interest:  compounds per year: | |
| Example A  Suppose you invest $13000 in an account that pays 8% interest compounded monthly. How much would be in the account after 9 years? | Example B  You loan out $800 to you friend at 3% interest compounded quarterly. Your friend pays you back after five years. What does he owe you? |
| Practice A | Practice B |

Compound Interest – Find Principle

|  |  |
| --- | --- |
| Evaluate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first | |
| Example A  How much money would have to be invested at 6% interest compounded weekly to be worth $1500 at the end of 15 years? | Example B  What principle would amount to $800 if invested for 10 years at 12% interest compounded semi-annually? |
| Practice A | Practice B |

Compound Interest – Continuous Compounds

|  |  |
| --- | --- |
| Continuous Interest: | |
| Example A  An investment of $25000 is at an interest rate of 11.5% compounded continuously. What is the balance after 20 years? | Example B  What is the balance at the end of 10 years on an investment of $13000 at 4% compounded continuously? |
| Practice A | Practice B |

Compound Interest – Finding Principle with Continuous Interest

|  |  |
| --- | --- |
| Evaluate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first | |
| Example A  To pay an $1100 vacation in 10 years, how much money should the Franklins invest at 9% interest compounded continuously? | Example B  How much should you invest at 12% continuous interest for 100 years in order to have $1,000,000? |
| Practice A | Practice B |

Logs - Convert

|  |  |
| --- | --- |
| Logarithm:  can be written as \_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A  Write each as a logarithm: | Example B  Write each as an exponent: |
| Practice A | Practice B |

Logs - Evaluate

|  |  |
| --- | --- |
| To evaluate a log: make the equation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and convert to an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Example A | Example B |
| Practice A | Practice B |

Logs - Solving

|  |  |
| --- | --- |
| To solve a logarithmic equation: | |
| Example A | Example B |
| Practice A | Practice B |