**Big Bend Community College**

**Beginning Algebra**

**MPC 095**

**Lab Notebook**


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**Table of Contents**

**Module A: Linear Equations 3**

**Module B: Graphing Linear Equations 31**

**Module C: Polynomials 50**

**Module D: Factoring 72**

**Module E: Rational Expressions 93**

**MPC 095 Module A:
Linear Equations**

Order of Operations – Introduction

|  |
| --- |
| The order:1.
2.
3.
4.

To remember: |
| Example A$$5-3(2+4^{2})$$ | Example B$$30÷5\left(2\right)+\left(4-7\right)^{2}$$ |
| Practice A | Practice B |

Order of Operations – Parenthesis

|  |
| --- |
| Different types of parenthesis:Always do \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first! |
| Example A$$\left(4+2\right)-[5^{2}÷\left(2+3\right)]$$ | Example B$$7\{2^{2}+2\left[20÷\left(4+6\right)\right]\}$$ |
| Practice A | Practice B |

Order of Operations – Fractions

|  |
| --- |
| When simplifying fractions, always simplify \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ first, then \_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{-4^{2}-\left(4+2∙3\right)}{5+3\left(5-4\right)}$$ | Example B$$\frac{\left(4+5\right)\left(2-9\right)}{2^{3}-\left(2^{2}+3\right)}$$ |
| Practice A | Practice B |

Order of Operations – Absolute Value

|  |
| --- |
| Absolute Value – just like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, make positive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$-3|2^{4}-\left(5+4\right)^{2}|$$ | Example B$$2-4|3^{2}+\left(5^{2}-6^{2}\right)|$$ |
| Practice A | Practice B |

Simplify Algebraic Expressions – Evaluate

|  |
| --- |
| Variables – Dozen is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ as 12To Evaluate: |
| Example A$$4x^{2}-3x+2 when x=-3$$ | Example B$$4b\left(2x+3y\right) when b=-2,x=5,y=-7$$ |
| Practice A | Practice B |

Simplify Algebraic Expressions – Combine Like Terms

|  |
| --- |
| Terms:Like Terms:When we have like terms we can \_\_\_\_\_\_\_\_\_\_\_ the coefficients of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$4x^{3}-2x^{2}+5x^{3}+2x-4x^{2}-6x$$ | Example B$$4y-2x+5-6y+7x-9$$ |
| Practice A | Practice B |

Simplify Algebraic Expressions – Distributive Property

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| --- |
| Distributive Property:We use the distributive property to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$-2(5x-4y+3)$$ | Example B$$4x(7x^{2}-6x+1)$$ |
| Practice A | Practice B |

Simplify Algebraic Expressions – Distribute and Combine

|  |
| --- |
| Order of operations tells us that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ comes before \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_So we will always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first and then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ last |
| Example A$$4\left(3x-7\right)-7(2x+1)$$ | Example B$$2\left(7x-3\right)-(8x+9)$$ |
| Practice A | Practice B |

Linear Equations – One Step Equations

|  |
| --- |
| Show that $x=-3$ is the solution to $4x+5=-7$We solve by working \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, using the inverse or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ operations! |
| Example A$$x+5=7$$ | Example B$$9=x-7$$ |
| Example C$$5x=35$$ | Example D$$\frac{x}{4}=3$$ |
| Practice A | Practice B |
| Practice C | Practice D |

Linear Equations – Two Step Equations

|  |
| --- |
| When solving we do Order of Operations in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_First we will \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ . Then we will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$5-7x=26$$ | Example B$$14=-2+4x$$ |
| Practice A | Practice B |

Linear Equations - General

|  |
| --- |
| Move variables to one side by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.Sometimes we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first.Simplify by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on each side. |
| Example A$$2x+7=-5x-3$$ | Example B$$4\left(2x-5\right)+3=5\left(4x-1\right)-10x$$ |
| Practice A | Practice B |

Linear Equations – Fractions

|  |
| --- |
| Clear fractions by multiplying \_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Important: Multiply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ including \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{3}{4}x-\frac{1}{2}=\frac{5}{6}$$ | Example B$$\frac{3}{5}x-\frac{7}{10}=-4+\frac{7}{15}x$$ |
| Practice A | Practice B |

Linear Equations – Distributing with Fractions

|  |
| --- |
| Important: Always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ second |
| Example A$$\frac{1}{2}=\frac{3}{4}\left(2x-\frac{4}{9}\right)$$ | Example B$$\frac{2}{3}\left(x+4\right)=5\left(\frac{5}{6}x-\frac{7}{15}\right)$$ |
| Practice A | Practice B |

Formulas – Two Step Formulas

|  |
| --- |
| Solving Formulas: Treat other variables like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.Final answer is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Example: $3x=15$ and $wx=y$ |
| Example A$$wx+b=y for x$$ | Example B$$ab+cd=wx+y for b$$ |
| Practice A | Practice B |

Formulas – Multi-Step Formulas

|  |
| --- |
| Strategy:  |
| Example A$$a\left(3x+b\right)=by for x$$ | Example B$$3\left(a+2b\right)+5b=-2a+b for a$$ |
| Practice A | Practice B |

Formulas – Fractions

|  |
| --- |
| Clear fractions by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_May have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first! |
| Example A$$\frac{5}{x}+4a=\frac{b}{x} for x$$ | Example B$$A=\frac{1}{2}h\left(b+c\right) for b$$ |
| Practice A | Practice B |

Absolute Value – Two Solutions

|  |
| --- |
| What is inside the absolute value can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_This means we have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\left|2x-5\right|=7$$ | Example B$$\left|7-5x\right|=17$$ |
| Practice A | Practice B |

Absolute Value – Isolate Absolute

|  |
| --- |
| Before we look at our two solutions, we must first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_We do this by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$5+2\left|3x-4\right|=11$$ | Example B$$-3-7\left|2-4x\right|=-32$$ |
| Practice A | Practice B |

Absolute Value – Two Absolutes

|  |
| --- |
| With two absolutes, we need \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_The first equation is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_The second equation is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\left|2x-6\right|=|4x+8|$$ | Example B$$\left|3x-5\right|=|7x+2|$$ |
| Practice A | Practice B |

Word Problems – Number Problems

|  |
| --- |
| Translate:* Is/Were/Was/Will Be:
* More than:
* Subtracted from/Less Then:
 |
| Example AFive less than three times a number is nineteen. What is the number? | Example BSeven more than twice a number is six less than three times the same number. What is the number? |
| Practice A | Practice B |

Word Problems – Consecutive Integers

|  |
| --- |
| Consecutive Numbers:First:Second:Third: |
| Example AFind three consecutive numbers whose sum is 543. | Example BFind four consecutive integers whose sum is $-$222 |
| Practice A | Practice B |

Word Problems – Consecutive Even/Odd

|  |  |
| --- | --- |
| Consecutive Even:First:Second:Third: | Consecutive Odd:First:Second:Third: |
| Example AFind three consecutive even integers whose sum is 84.  | Example BFind four consecutive odd integers whose sum is 152. |
| Practice A | Practice B |

Word Problems – Triangles

|  |
| --- |
| Angles of a triangle add to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example ATwo angles of a triangle are the same measure. The third angle is 30 degrees less than the first. Find the three angles. | Example BThe second angle of a triangle measures twice the first. The third angle is 30 degrees more than the second. Find the three angles. |
| Practice A | Practice B |

Word Problems – Perimeter

|  |
| --- |
| Formula for Perimeter of a rectangle:Width is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ side |
| Example AA rectangle is three times as long as it is wide. If the perimeter is 62 cm, what is the length? | Example BThe width of a rectangle is 6 cm less than the length. If the perimeter is 52 cm, what is the width? |
| Practice A | Practice B |

Age Problem – Variable Now

|  |
| --- |
| Table:Equation is always for the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example ASue is five years younger than Brian. In seven years the sum of their ages will be 49 years. How old is each now? | Example BMaria is ten years older than Sonia. Eight years ago Maria was three times Sonia’s age. How old is each now? |
| Practice A | Practice B |

Age Problem – Sum Now

|  |
| --- |
| Consider: Sum of 8…When we have the sum now, for the first box we use \_\_\_\_\_\_ and the second we use \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example AThe sum of the ages of a man and his son is 82 years. How old is each if 11 years ago, the man was twice his son’s age? | Example BThe sum of the ages of a woman and her daughter is 38 years. How old is each if the woman will be triple her daughter’s age in 9 years? |
| Practice A | Practice B |

Age Problems – Variable Time

|  |
| --- |
| If we don’t know the time: |
| Example AA man is 23 years old. His sister is 11 years old. How many years ago was the man triple his sister’s age? | Example BA woman is 11 years old. Her cousin is 32 years old. How many years until her cousin is double her age? |
| Practice A | Practice B |

**MPC 095 Module B:
Graphing Linear Equations**

Inequalities – Graphing

|  |
| --- |
| Inequalities:* Less Than
* Less Than or Equal To
* Greater Than
* Greater Than or Equal To

Graphing on Number Line – Use for less/greater than and use when its “or equal to” |
| Example AGraph $x\geq -3$http://img.sparknotes.com/figures/5/50ca5e784bb7e4242910d5b8a571d103/number_line.gif | Example BGive the inequalityhttp://img.sparknotes.com/figures/5/50ca5e784bb7e4242910d5b8a571d103/number_line.gif |
| Practice A | Practice B |

Inequalities – Interval Notation

|  |
| --- |
| Interval notation:( , )Use for less/greater than and use when its “or equal to”$\infty $ and $-\infty $ always use a  |
| Example Ahttp://img.sparknotes.com/figures/5/50ca5e784bb7e4242910d5b8a571d103/number_line.gifGive Interval Notation | Example Bhttp://img.sparknotes.com/figures/5/50ca5e784bb7e4242910d5b8a571d103/number_line.gifGraph the interval $(-\infty ,-1)$  |
| Practice A | Practice B |

Inequalities - Solving

|  |
| --- |
| Solving inequalities is just like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_The only exception is if you \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by a \_\_\_\_\_\_\_\_\_\_\_\_\_, you must\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$7-5x\leq 17$$ | Example B$$3\left(x+8\right)+2>5x-20$$ |
| Practice A | Practice B |

Inequalities - Tripartite

|  |
| --- |
| Tripartite Inequalities:When solving \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_When graphing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  |
| Example A$$2\leq 5x+7<22$$ | Example B$$5<5-4x\leq 13$$ |
| Practice A | Practice B |

Graphing and Slope – Points and Lines

|  |
| --- |
| The coordinate plane: Give \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to a point going \_\_\_\_\_\_\_\_\_\_\_\_\_\_ then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as \_\_\_\_\_\_\_\_\_ |
| Example AGraph the points $\left(-2,3\right), \left(4,-1\right), \left(-2,-4\right), \left(0,3\right), and (-1,0)$ | Example BGraph the line: $y=0.5x-2$ |
| Practice A | Practice B |

Graphing and Slope – Slope from a graph

|  |
| --- |
| Slope: |
| Example A | Example B |
| Practice A | Practice B |

Graphing and Slope – Slope from two points

|  |
| --- |
| Slope: |
| Example AFind the slope between $\left(7,2\right) and (11,4)$ | Example BFind the slope between $\left(-2,-5\right) and (-17,4)$ |
| Practice A | Practice B |

Equations – Slope Intercept Equation

|  |
| --- |
| Slope-Intercept Equation: |
| Example AGive the equation with a slope of $-\frac{3}{4}$ and y-intercept of $2$ | Example BGive the equation of the graph |
| Practice A | Practice B |

Equations – Put in Intercept Form

|  |
| --- |
| We may have to put an equation in intercept form.To do this we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example AGive the slope and y-intercept$$5x+8y=17$$ | Example BGive the slope and y-intercept$$y+4=\frac{2}{3}(x-4)$$ |
| Practice A | Practice B |

Equations - Graph

|  |
| --- |
| We can graph an equation by identifying the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Start at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to changeRemember slope is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example AGraph $y=-\frac{3}{4}x+2$ | Example BGraph $3x-2y=2$ |
| Practice A | Practice B |

Equations – Vertical/Horizontal

|  |
| --- |
| Vertical Lines are always \_\_\_\_\_\_ equals the \_\_\_\_\_\_\_\_\_\_Horizontal Lines are always \_\_\_\_\_\_\_\_\_ equals the \_\_\_\_\_\_\_\_\_\_ |
| Example AGraph $y=-2$ | Example BFind the equation |
| Practice A | Practice B |

Equations – Point Slope

|  |
| --- |
| Point Slope Equation: |
| Example AGive the equation of the line that passes through $(-3,5)$ and has a slope of $-\frac{2}{3}$ | Example BGive the equation of the line that passes through $(6,-2)$ and has a slope of$ 4$. Give your final answer in slope-intercept form. |
| Practice A | Practice B |

Equations – Given Two Points

|  |
| --- |
| To find the equation of a line you must have the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Recall the formula for slope:  |
| Example AFind the equation of the line through $(-3,-5)$ and $(2,5)$. | Example BFind the equation of the line through $(1,-4)$ and $(3,5)$. Give answer in slope-intercept form. |
| Practice A | Practice B |

Parallel and Perpendicular - Slope

|  |
| --- |
| Parallel Lines: Perpendicular Lines:Slope: Slope: |
| Example AOne line goes through $\left(5,2\right)$ and $(7,5)$. Another line goes through $(-2,-6)$ and $(0,-3)$. Are the lines parallel, perpendicular, or neither? | Example BOne line goes through $(-4,1)$ and $(-1,3)$. Another line goes through $(2,-1)$ and $(6,-7)$. Are the lines parallel, perpendicular, or neither? |
| Practice A | Practice B |

Parallel and Perpendicular - Equations

|  |
| --- |
| Parallel lines have the \_\_\_\_\_\_\_\_\_\_ slope, Perpendicular lines have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ slopesOnce we know the slope and a point we can use the formula: |
| Example AFind the equation of the line parallel to the line $2x-5y=3$ that goes through the point $(5,3)$ | Example BFind the equation of the line perpendicular to line $3x+2y=5$ that goes through the point $(-3,-4)$ |
| Practice A | Practice B |

Distance – Opposite Directions

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| --- |
| The distance Table:Opposite Directions: |
| Example ABrian and Jennifer both leave the convention at the same time traveling in opposite directions. Brian drove 35 mph and Jennifer drove 50 mph. After how much time were they 340 miles apart? | Example BMaria and Tristan are 126 miles apart biking towards each other. If Maria bikes 6 mph faster than Tristan and they meet after 3 hours, how fast did each ride? |
| Practice A | Practice B |

Distance – Catch Up

|  |
| --- |
| A head start: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the head start to his/her \_\_\_\_\_\_\_\_\_\_\_\_\_Catch Up: |
| Example ARaquel left the party traveling 5 mph. Four hours later Nick left to catch up with her, traveling 7 mph. How long will it take him to catch up? | Example BTrey left on a trip traveling 20 mph. Julian left 2 hours later, traveling in the same direction at 30 mph. After how many hours does Julian pass Trey? |
| Practice A | Practice B |

Distance – Total Time

|  |
| --- |
| Consider: Total time of 8…When we have a total time, for the first box we use \_\_\_\_\_\_ and the second we use \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example ALupe rode into the forest at 10 mph, turned around and returned by the same route traveling 15 mph. If her trip took 5 hours, how long did she travel at each rate? | Example BIan went on a 230 mile trip. He started driving 45 mph. However, due to construction on the second leg of the trip, he had to slow down to 25 mph. If the trip took 6 hours, how long did he drive at each speed? |
| Practice A | Practice B |

**MPC 095 Module C:
Polynomials**

Exponents – Product Rule

|  |
| --- |
| $a^{3}∙a^{2}=$ Product Rule: $a^{m}∙a^{n}=$ |
| Example A$$\left(2x^{3}\right)\left(4x^{2}\right)(-3x)$$ | Example B$$\left(5a^{3}b^{7}\right)(2a^{9}b^{2}c^{4})$$ |
| Practice A | Practice B |

Exponents – Quotient Rule

|  |
| --- |
| $\frac{a^{5}}{a^{3}}=$ Quotient Rule: $\frac{a^{m}}{a^{n}}=$ |
| Example A$$\frac{a^{7}b^{2}}{a^{3}b}$$ | Example B$$\frac{8m^{7}n^{4}}{6m^{5}n}$$ |
| Practice A | Practice B |

Exponents – Power Rules

|  |
| --- |
| $\left(ab\right)^{3}=$ Power of a Product: $\left(ab\right)^{m}=$$\left(\frac{a}{b}\right)^{3}=$ Power of a Quotient: $\left(\frac{a}{b}\right)^{m}=$$\left(a^{2}\right)^{3}=$ Power of a Power: $\left(a^{m}\right)^{n}=$ |
| Example A$$\left(5a^{4}b\right)^{3}$$ | Example B$$\left(\frac{5m^{3}}{9n^{4}}\right)^{2}$$ |
| Practice A | Practice B |

Exponents - Zero

|  |
| --- |
| $\frac{a^{3}}{a^{3}}=$ Zero Power Rule: $a^{0}=$ |
| Example A$$\left(5x^{3}yz^{5}\right)^{0}$$ | Example B$$\left(3x^{2}y^{0}\right)(5x^{0}y^{4})$$ |
| Practice A | Practice B |

Exponents – Negative Exponents

|  |
| --- |
| $\frac{a^{3}}{a^{5}}=$ Negative Exponent Rules: $a^{-m}=$ $\frac{1}{a^{-m}}=$ $\left(\frac{a}{b}\right)^{-m}=$ |
| Example A$$\frac{7x^{-5}}{3^{-1}yz^{-4}}$$ | Example B$$\frac{2}{5a^{-4}}$$ |
| Practice A | Practice B |

Exponents - Properties

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |  |
| --- | --- | --- |
| $$a^{m}a^{n}=$$ | $$\frac{a^{m}}{a^{n}}=$$ | $$\left(ab\right)^{m}=$$ |
| $$\left(\frac{a}{b}\right)^{m}=$$ | $$\left(a^{m}\right)^{n}=$$ | $$a^{0}=$$ |
| $$a^{-m}=$$ | $$\frac{1}{a^{-m}}=$$ | $$\left(\frac{a}{b}\right)^{-m}=$$ |

To simplify:  |
| Example A$$\left(4x^{5}y^{2}z\right)^{2}\left(2x^{4}y^{-2}z^{3}\right)^{4}$$ | Example B$ $$$\frac{\left(2x^{2}y^{3}\right)^{4}\left(x^{4}y^{-6}\right)^{-2}}{\left(x^{-6}y^{4}\right)^{2}}$$ |
| Practice A | Practice B |

Scientific Notation - Convert

|  |
| --- |
| $a×10^{b}$ * $a$
* $b$
* $b$ positive
* $b$ negative
 |
| Example AConvert to Standard Notation$$5.23×10^{5}$$ | Example BConvert to Standard Notation$$4.25×10^{-4}$$ |
| Example CConvert to Scientific Notation$$8150000$$ | Example CConvert to Scientific Notation$$0.00000245$$ |
| Practice A | Practice B |
| Practice C | Practice D |

Scientific Notation – Close to Scientific

|  |
| --- |
| Put number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Then use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the 10’s  |
| Example A$$523.6×10^{-8}$$ | Example B$$0.0032×10^{5}$$ |
| Practice A | Practice B |

Scientific Notation – Multiply/Divide

|  |
| --- |
| Multiply/Divide the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the 10’s |
| Example A$$\left(3.4×10^{5}\right)(2.7×10^{-2})$$ | Example B$$\frac{5.32×10^{4}}{1.9×10^{-3}}$$ |
| Practice A | Practice B |

Scientific Notation – Multiply/Divide where answer not scientific

|  |
| --- |
| If your final answer is not in scientific notation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\left(6.7×10^{-6}\right)(5.2×10^{-3})$$ | Example B$$\frac{2.352×10^{-6}}{8.4×10^{-2}}$$ |
| Practice A | Practice B |

Polynomials - Evaluate

|  |
| --- |
| Term:Monomial:Binomial:Trinomial:Polynomial: |
| Example A$5x^{2}-2x+6$ when $x=-2$ | Example B$-x^{2}+2x-7$ when $x=4$ |
| Practice A | Practice B |

Polynomials – Add/Subtract

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| --- |
| To add polynomials:To subtract polynomials: |
| Example A$$\left(5x^{2}-7x+9\right)+\left(2x^{2}+5x-14\right)$$ | Example B$$\left(3x^{3}-4x+7\right)-(8x^{3}+9x-2)$$ |
| Practice A | Practice B |

Polynomials – Multiply by Monomials

|  |
| --- |
| To multiply a monomial by polynomial: |
| Example A$$5x^{2}(6x^{2}-2x+5)$$ | Example B$$-3x^{4}(6x^{3}+2x-7)$$ |
| Practice A | Practice B |

Polynomials – Multiply by Binomials

|  |
| --- |
| To multiply a binomial by a binomial: This process is often called \_\_\_\_\_\_\_\_\_ which stands for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\left(4x-2\right)(5x+1)$$ | Example B$$\left(3x-7\right)(2x-8)$$ |
| Practice A | Practice B |

Polynomials – Multiply by Trinomials

|  |
| --- |
| Multiplying trinomials is just like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ we just have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\left(2x-4\right)(3x^{2}-5x+1)$$ | Example B$$\left(2x^{2}-6x+1\right)(4x^{2}-2x-6)$$ |
| Practice A | Practice B |

Polynomials – Multiply Monomials and Binomials

|  |
| --- |
| Multiply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$4\left(2x-4\right)\left(3x+1\right)$$ | Example B$$3x\left(x-6\right)(2x+5)$$ |
| Practice A | Practice B |

Polynomials – Sum and Difference

|  |
| --- |
| $\left(a+b\right)\left(a-b\right)=$ Sum and Difference Shortcut: |
| Example A$$\left(x+5\right)(x-5)$$ | Example B$$\left(6x-2\right)(6x+2)$$ |
| Practice A | Practice B |

Polynomials – Perfect Square

|  |
| --- |
| $\left(a+b\right)^{2}=$ Perfect Square Shortcut: |
| Example A$$\left(x-4\right)^{2}$$ | Example B$$\left(2x+7\right)^{2}$$ |
| Practice A | Practice B |

Division – By Monomials

|  |
| --- |
| Long Division Review:  5|2632 |
| Example A$$\frac{3x^{5}+18x^{4}-9x^{3}}{3x^{2}}$$ | Example B$$\frac{15a^{6}-25a^{5}+5a^{4}}{5a^{4}}$$ |
| Practice A | Practice B |

Division – By Polynomials

|  |
| --- |
| On division step, only focus on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{x^{3}-2x^{2}-15x+30}{x+4}$$ | Example B$$\frac{4x^{3}-6x^{2}+12x+8}{2x-1}$$ |
| Practice A | Practice B |

Division – Missing Terms

|  |
| --- |
| The exponents MUST \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_If one is missing we will add \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{3x^{3}-50x+4}{x-4}$$ | Example B$$\frac{2x^{3}+4x^{2}+9}{x+3}$$ |
| Practice A | Practice B |

**MPC 095 Module D:
Factoring**

GCF and Grouping – Find the GCF

|  |
| --- |
| Greatest Common Factor:On variables we use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example AFind the Common Factor$$15a^{4}+10a^{2}-25a^{5}$$ | Example BFind the Common Factor$$4a^{4}b^{7}-12a^{2}b^{6}+20ab^{9}$$ |
| Practice A | Practice B |

GCF and Grouping – Factor GCF

|  |
| --- |
| $a\left(b+c\right)=$ Put \_\_\_\_\_\_\_ in front, and divide. What is left goes in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$9x^{4}-12x^{3}+6x^{2}$$ | Example B$$21a^{4}b^{5}-14a^{3}b^{7}+7a^{2}b^{4}$$ |
| Practice A | Practice B |

GCF and Grouping – Binomial GCF

|  |
| --- |
| GCF can be a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$5x\left(2y-7\right)+6y(2y-7)$$ | Example B$$3x\left(2x+1\right)-7(2x+1)$$ |
| Practice A | Practice B |

GCF and Grouping - Grouping

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| --- |
| Grouping: GCF of the \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_  then factor out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (if it matches!) |
| Example A$$15xy+10y-18x-12$$ | Example B$$6x^{2}+3xy+2x+y$$ |
| Practice A | Practice B |

GCF and Grouping – Change Order

|  |
| --- |
| If binomials don’t match: |
| Example A$$12a^{2}-7b+3ab-28a$$ | Example B$$6xy-20+8x-15y$$ |
| Practice A | Practice B |

Trinomials – $a\ne 1$

|  |
| --- |
| $ax^{2}+bx+c$ AC Method: Find a pair of numbers that multiply to \_\_\_\_\_ and add to \_\_\_\_\_Using FOIL, these numbers come from \_\_ and \_\_ |
| Example A$$3x^{2}+11x+10$$ | Example B$ $$$12x^{2}+16xy-3y^{2}$$ |
| Practice A | Practice B |

Trinomials – $a\ne 1$ with GCF

|  |
| --- |
| Always factor the \_\_\_\_\_\_\_\_ first! |
| Example A$$18x^{4}-21x^{3}-15x^{2}$$ | Example B$$16x^{3}+28x^{2}y-30xy^{2}$$ |
| Practice A | Practice B |

Trinomials – $a=1$

|  |
| --- |
| If there is a \_\_\_\_\_\_ in front of $x^{2}$, the $ac$ method gives us \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$x^{2}-2x-8$$ | Example B$$x^{2}+7xy-8y^{2}$$ |
| Practice A | Practice B |

Trinomials – $a=1$ with GCF

|  |
| --- |
| Always do the \_\_\_\_\_\_\_ first!! |
| Example A$$7x^{2}+21x-70$$ | Example B$$4x^{4}y+36x^{3}y^{2}+80x^{2}y^{3}$$ |
| Practice A | Practice B |

Special Products – Difference of Squares

|  |
| --- |
| $\left(a+b\right)\left(a-b\right)=$ Difference of Squares: |
| Example A$$a^{2}-81$$ | Example B$$49x^{2}-25y^{2}$$ |
| Practice A | Practice B |

Special Products – Sum of Squares

|  |
| --- |
| Factor: $a^{2}+b^{2}$Sum of Squares is always \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$x^{2}+9$$ | Example B$$16a^{2}+25b^{2}$$ |
| Practice A | Practice B |

Special Products – Difference of 4th Powers

|  |
| --- |
| The square root of $x^{4}$ is \_\_\_\_\_\_\_\_\_\_\_\_\_With fourth powers we can use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ twice! |
| Example A$$a^{4}-16$$ | Example B$$81x^{4}-256$$ |
| Practice A | Practice B |

Special Products – Perfect Squares

|  |
| --- |
| Using the ac method if the numbers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then it factors to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$x^{2}-10x+25$$ | Example B$$9x^{2}+30xy+25y^{2}$$ |
| Practice A | Practice B |

Special Products – Cubes

|  |
| --- |
| Sum of Cubes:Difference of Cubes: |
| Example A$$m^{3}+125$$ | Example B$$8a^{3}-27y^{3}$$ |
| Practice A | Practice B |

Special Products - GCF

|  |
| --- |
| Always factor the \_\_\_\_\_\_\_\_\_\_\_ first!! |
| Example A$$8x^{3}-18x$$ | Example B$$2x^{2}y-12xy+18y$$ |
| Practice A | Practice B |

Factoring Strategy - Strategy

|  |  |  |  |
| --- | --- | --- | --- |
| Always do \_\_\_\_\_\_\_\_ First

|  |  |  |
| --- | --- | --- |
| 2 terms: | 3 terms: | 4 terms: |

 |
| Example AWhich method would you use?$$25x^{2}-16$$ | Example BWhich method would you use?$$x^{2}-x-20$$ |
| Example CWhich method would you use?$$xy+2y+5x+10$$ | Practice A |
| Practice B | Practice C |
| Practice D | Practice E |

Solve by Factoring – Zero Product Property

|  |
| --- |
| Zero Product Rule:To solve we set each \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\left(5x-1\right)\left(2x+5\right)=0$$ | Example B$$2x\left(x-6\right)\left(2x+3\right)=0$$ |
| Practice A | Practice B |

Solve by Factoring – Need to Factor

|  |
| --- |
| If we have $x^{2}$ and $x$ in an equation, we need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ before we \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$x^{2}-4x-12=0$$ | Example B$$3x^{2}+x-4=0$$ |
| Practice A | Practice B |

Solve by Factoring – Equal to Zero

|  |
| --- |
| Before we factor, the equation must equal \_\_\_\_\_\_\_\_\_\_\_\_\_.To make factoring easier, we want the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Example A$$5x^{2}=2x+16$$ | Example B$$-2x^{2}=x-3$$ |
| Practice A | Practice B |

Solve by Factoring - Simplify

|  |
| --- |
| Before we make the equation equal zero, we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ first. |
| Example A$$2x\left(x+4\right)=3x-3$$ | Example B$$\left(2x-3\right)\left(3x+1\right)=-8x-1$$ |
| Practice A | Practice B |

**MPC 095 Module E:
Rational Expressions**

Reduce - Evaluate

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| --- |
| Rational Expressions: Quotient of two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{x^{2}-2x-8}{x-4} when x=-4$$ | Example B$$\frac{x^{2}-x-6}{x^{2}+x-12} when x=2$$ |
| Practice A | Practice B |

Reduce – Reduce Fractions

|  |
| --- |
| To reduce fractions we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ common \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{24}{15}$$ | Example B$$\frac{48}{18}$$ |
| Practice A | Practice B |

Reduce - Monomials

|  |
| --- |
| Quotient Rule of Exponents: $\frac{a^{m}}{a^{n}}=$ |
| Example A$$\frac{16x^{5}}{12x^{9}}$$ | Example B$$\frac{15a^{3}b^{2}}{25ab^{5}}$$ |
| Practice A | Practice B |

Reduce - Polynomials

|  |
| --- |
| To reduce we \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ common \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_This means we must first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{2x^{2}+5x-3}{2x^{2}-5x+2}$$ | Example B$$\frac{9x^{2}-30x+25}{9x^{2}-25}$$ |
| Practice A | Practice B |

Multiply and Divide - Fractions

|  |
| --- |
| First \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ common \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Then multiply \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Division is the same, with one extra step at the start: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{6}{35}∙\frac{21}{10}$$ | Example B$$\frac{5}{8}÷\frac{10}{4}$$ |
| Practice A | Practice B |

Multiply and Divide - Monomials

|  |
| --- |
| With monomials we can use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_$a^{m}∙a^{n}=$ $\frac{a^{m}}{a^{n}}=$  |
| Example A$$\frac{6x^{2}y^{5}}{5x^{3}}∙\frac{10x^{4}}{3x^{2}y^{7}}$$ | Example B$ $$$\frac{4a^{5}b}{9a^{4}}÷\frac{6ab^{4}}{12b^{2}}$$ |
| Practice A | Practice B |

Multiply and Divide - Polynomials

|  |
| --- |
| To divide out factors, we must first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{x^{2}+3x+2}{4x-12}∙\frac{x^{2}-5x+6}{x^{2}-4}$$ | Example B$$\frac{3x^{2}+5x-2}{x^{2}+3x+2}÷\frac{6x^{2}+x-1}{x^{2}-3x-4}$$ |
| Practice A | Practice B |

Multiply and Divide – Both at Once

|  |
| --- |
| To divide:Be sure to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ before \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{x^{2}+3x-10}{x^{2}+6x+5}∙\frac{2x^{2}-x-3}{2x^{2}+x-6}÷\frac{8x+20}{6x+15}$$ | Example B$$\frac{x^{2}-1}{x^{2}-x-6}∙\frac{2x^{2}-x-15}{3x^{2}-x-4}÷\frac{2x^{2}+3x-5}{3x^{2}+2x-8}$$ |
| Practice A | Practice B |

LCD - Numbers

|  |
| --- |
| Prime Factorization:To find the LCD use \_\_\_\_\_\_\_\_\_\_\_\_\_\_ factors with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exponents.  |
| Example A$$20 and 36$$ | Example B$$18, 54 and 81$$ |
| Practice A | Practice B |

LCD - Monomials

|  |
| --- |
| Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ factors with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exponents |
| Example A$$5x^{3}y^{2} and 4x^{2}y^{5}$$ | Example B$$7ab^{2}c and 3a^{3}b$$ |
| Practice A | Practice B |

LCD - Polynomials

|  |
| --- |
| Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ factors with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exponentsThis means we must first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$x^{2}+3x-18 and x^{2}+4x-21$$ | Example B$$x^{2}-10x+25 and x^{2}-x-20$$ |
| Practice A | Practice B |

Add and Subtract - Fractions

|  |
| --- |
| To add or subtract we \_\_\_\_\_\_\_\_\_\_\_ the denominators by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the missing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |
| Example A$$\frac{5}{20}+\frac{7}{15}$$ | Example B$$\frac{8}{14}-\frac{3}{10}$$ |
| Practice A | Practice B |

Add and Subtract – Common Denominator

|  |
| --- |
| Add the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and keep the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_When subtracting we will first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the negativeDon’t forget to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Example A$$\frac{x^{2}+4x}{x^{2}-2x-15}+\frac{x+6}{x^{2}-2x-15}$$ | Example B$$\frac{x^{2}+2x}{2x^{2}-9x-5}-\frac{6x+5}{2x^{2}-9x-5}$$ |
| Practice A | Practice B |

Add and Subtract – Different Denominators

|  |
| --- |
| To add or subtract we \_\_\_\_\_\_\_\_\_\_\_ the denominators by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the missing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.This means we may have to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to find the LCD! |
| Example A$$\frac{2x}{x^{2}-9}+\frac{5}{x^{2}+x-6}$$ | Example B$$\frac{2x+7}{x^{2}-2x-3}-\frac{3x-2}{x^{2}+6x+5}$$ |
| Practice A | Practice B |

Dimensional Analysis – Convert Single Unit

|  |
| --- |
| Multiply by \_\_\_ and value does not change$1=$ Ask questions:1.
2.
3.
 |
| Example A5 feet to meters | Example B3 miles to yards |
| Practice A | Practice B |

Dimensional Analysis – Convert Two Units

|  |
| --- |
| “Per” is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Clear \_\_\_\_\_\_\_\_\_\_\_ unit at a time! |
| Example A100 feet per second to miles per hour | Example B25 miles per hour to kilometers per minute |
| Practice A | Practice B |