## Intermedierte Algebran math Doumnell Gopics

Each unit has a set number of required topics that must be answered, following the requirements on the Math Journal Rubric. The rubric has a 4 point system, $0,1,2$, and 3. You must maintain an $80 \%$ average, or 2.4 points. If this requirement is not met, you will
need to revise a response and resubmit your journal. Questions must meet rubric requirements as well.

## Unit 1: Graphing and Writing Linear Equations and Inequalities

 (Up to 2 can be questions)- Chapter 1: Algebra Basics (Choose 1)
- Describe the difference between an expression and an equation.
- Describe the difference between whole numbers and positive integers.
- Are the expressions $2(x+1)$ and $2 x+1$ equivalent?
- How can you tell whether the mean of $n$ numbers is negative without actually dividing the sum of the numbers by $n$ ?
- Given the graph of a function, describe how to write a rule for the function.
- Describe the steps you would use to evaluate the expression $2(3 x+1)^{2}$ when $x=3$.
- Chapter 2: Linear Equations and Inequalities (Choose 2)
- Describe two ways to solve the equation $2(4 x-11)=10$.
- Describe the steps in solving the linear equation $3(3 x-8)=4 x+6$.
- Without calculating, how do you know that the equation $|4 x-7|=-1$ has no solution?
- What is an extraneous solution?
- Compare solving equations using addition with solving inequalities with addition.
- Write an inequality that is solving using the Division Property of Inequality where the inequality symbol needs to be reversed. Solve the inequality, identifying all of the steps.
- Compare solving multi-step inequalities and solving multi-step equations.
- Chapter 3: Linear Functions, Graphs, Equations and Inequalities (Choose 2)
- How are $x$-intercepts and $y$-intercepts alike? How are they different?
- What is the slope-intercept form of a linear function? Explain why this form is called the slope-intercept form.
- Explain how you can use slope-intercept form to write an equation of a line given its slope and $y$-intercept.
- Two lines are perpendicular. The slope of one line is $-5 / 7$. What is the slope of the other line?
- Describe how to graph an inequality.


## Unit 2: Systems of Equations and Polynomials

(Up to 2 can be questions)

- Chapter 4: Systems of Linear Equations and Inequalities (Choose 2)
- Describe how to solve a system of linear equations by substitution.
- Explain how to solve a system of linear equations by elimination.
- Compare the graph of a system of linear equations that has infinitely many solutions and the graph of a system of linear equations that has no solutions.
- Is it possible for a system of linear equations to have exactly two solutions?
- Compare the graph of a linear inequality in two variables with the graph of a linear equation in two variables.
- How can you verify that an ordered pair is a solution of a system of linear inequalities?
- Explain how you know when a linear system in three variables has infinitely many solutions.
- A linear system in three variables has no solution. Your friend concludes that it is not possible for two of the three equations to have any points in common. Is your friend correct?
- Explain when it might be more convenient to use the elimination method than the substitution method to solve a linear system. Give an example to support your claim.
- Chapter 5: Polynomials (Choose 3)
- When is a polynomial in one variable in standard form?
- Explain how the letters of the word FOIL help you to remember how to multiply two binomials.
- Explain how to use the square of a binomial pattern.
- Explain how to use the Zero Product Property to find the solutions of the equation $3 x(x-6)=0$.
- You are factoring $x^{2}+11 x-26$. What do the signs of the terms tell you about the factors?
- Compare factoring $6 x^{2}-x-2$ with factoring $x^{2}-x-2$.
- What does it mean for a polynomial to factored completely?
- Your fiend claims the sum of two binomials is always a binomial and the product of two binomials is always a trinomial. Is your friend correct?
- Explain the Remainder Theorem in your own words. Use an example in your explanation.
- How do you know when a polynomial is factored completely?
- Explain the factor Theorem and why it is useful.
(Up to 2 can be questions)
- Chapter 6: Rational Expressions and Equations (Choose 2)
- Describe a real life situation that can be modeled by an inverse variation.
- Suppose $x$ varies inversely with $y$ and $y$ varies inversely with $z$. How does $x$ vary with z? Justify your answer.
- Your friend claims that it is possible for a rational function to have two vertical asymptotes. Is your friend correct?
- Describe how to multiply and divide two rational equations.
- Explain how adding and subtracting two rational functions is similar to adding and subtracting numerical fractions.
- Your friend claims that the least common multiple of two numbers is always greater than each of the numbers. Is your friend correct?
- When can you solve a rational equation by cross multiplying? When can't you?
- Chapter 7: Radical Expressions and Equations (Choose 2)
- Explain how to use the sign of a to determine the number of real fourth roots of $a$ and the number of real fifth roots of $a$.
- How do you know when a radical expression is in simplest form?
- Your friend claims it is not possible to simplify the expression $7 \sqrt{11}-9 \sqrt{44}$ because it does not contain like radicals. Is your friend correct?
- Explain the steps you should use to solve $\sqrt{x}+10<15$.
- Your friend says it is impossible for a radical equation to have two extraneous solutions. Is your friend correct?
- What $x$-values are not included in the domain of the quotient of two functions?
- Explain how to determine whether the inverse of a function is also a function.


## Unit 4: Quadratic, Exponential and Logarithmic Functions

## (Up to 2 can be questions)

- Chapter 8: Quadratic Equations, Functions, and Inequalities (Choose 2)
- Can you solve an equation by competing the square when the equation has two imaginary solutions?
- Your friend says the equation $x^{2}+10 x=-20$ can be solved by either completing the square or factoring. Is your friend correct?
- Describe the different types of solutions you can have based on the discriminant.
- Which two methods can you use to solve any quadratic equation? Explain when you might prefer to use one method over the other.
- Describe the possible solutions of a system consisting of two quadratic equations.
- Chapter 9: Exponential and Logarithmic Functions (Choose 2)
- Describe a real life situation that can be modeled by an inverse variation.
- Suppose $x$ varies inversely with $y$ and $y$ varies inversely with $z$. How does $x$ vary with z? Justify your answer.
- Tell whether the function $f(x)=1 / 3 e^{4 x}$ represents exponential growth or decay.
- Can the natural base e be written as a ratio of two integers?
- Describe the relationship between $y=7^{x}$ and $y=\log _{7} x$.
- Your friend claims you can use the change-of-base formula to graph $y=\log _{3} x$ using a graphing calculator. Is your friend correct?
- Compare the methods for solving exponential and logarithmic equations.
- When do logarithmic equations have extraneous solutions?

