Analysis Learning Goals **2024-2025**

Sequences

Given the first 3 to 4 terms in a sequence (arithmetic, geometric, or neither) I can…

1. Identify the pattern and generate next terms
2. Describe the pattern in words
3. Define the pattern with a recursive formula *(Reminder- Recursive formulas must include first term, A_1 or A_0 on application problems!)*
4. Define the pattern with a general formula
5. Classify the sequence as arithmetic, geometric or neither

Given a recursively defined sequence I can…

1. Generate the terms of the sequence
2. Put the sequence into Google Sheets and use the table to look at sequence terms. *(Optional- Show in class at least, up to teacher whether or not to ask students to use sequence mode.)*

Given a general formula for a sequence I can…

1. Generate any term in the sequence.
2. Put the sequence into Google Sheets and use the table to look at sequence terms. *(Optional- Show in class at least, up to teacher whether or not to ask students to use sequence mode.)*

Given an expression using summation notation I can…

1. Expand by writing the expression as a sum of the appropriate individual terms of the sequence described.
2. Evaluate the expression. (In other words, find the indicated sum.)

Given a factorial expression I can…

1. Expand by writing the expression as a product of integers.
2. Evaluate the expression. (In other words, find value.)
3. Evaluate quotients of factorials, without a calculator, by reducing first.

Given an application describing an arithmetic sequence (Ex. seats in a stadium)

1. Model the situation with the appropriate arithmetic sequence
2. Answer related questions about terms in the context of the problem

Given an application describing a geometric sequence (Ex. Investment in a savings account with a constant interest rate, car value depreciation at a constant depreciation rate, hypothetical population growth)

1. Model the situation with the appropriate geometric sequence
2. Answer related questions about terms in the context of the problem

Loans- I can…

1. Describe why people take out loans.
2. Describe why banks and lenders charge interest
3. Use a recursive formula for a loan to generate first few months balances by hand
4. Write a recursive formula to represent the balance of the loan.
5. Put the loan formula into a spreadsheet *(Again, asking students to use sequence mode is optional. Will look at amortization of a loan on the spreadsheets.)*
6. Create an amortization schedule on a Spreadsheet
7. Calculate the total interest paid over the life of a loan.
8. Explain answers in complete sentences in the context of the problem.
9. Describe the pros and cons of taking out a loan for a house or a car. Buying a home vs. renting or alternative. Buy car vs. leasing or alternative.

Other- I can…

1. Solve percent increase and decrease problems.
2. Identify when an answer does not make sense.
3. Get 5% and 10% and multiples of 5% and 10% of a number without a calculator.

Spreadsheets - I can...

1. Layout a simple spreadsheet including using numeric formatting, font size, cell colors.
2. Relate cells through arithmetic manipulations.
3. Use basic spreadsheet functions such as sum, average, min, and max.
4. Use spreadsheets to solve weighted sums problems such as calculating term grades for students.
5. Calculate the monthly payment using the PMT function for a given loan amount, interest rate and term.
6. Build an amortization table to show loan balances over time.
7. Compare and contrast multiple loans (ex. different length loans) with the spreadsheet.
8. *If we have enough time in the computer lab* - Produce charts (pie, line, bar, histogram) representing spreadsheet data. Produce charts showing the changes over time of balance, cumulative interest paid, and cumulative principal paid. *(If we don't work with the charts on the computer now, we will later this year.)*

Business Algebra

Students will be able to...

1. Interpret Scatterplots
2. Create scatterplots
3. Create a line of best fit for scatterplots
4. Explain the law of supply and the law of demand
5. Interpret and create a graph of supply and demand at given price points

6. Model a business' expense equations using a linear equation
7. Model a business' revenue equation using a quadratic equation
8. Find a business' break-even point on a graph
9. Create the profit equation for a business

Fermi Unit - Estimation and Calculations with Big & Small Numbers I can...

1. Given a number in one of the following 3 forms, state it in the other two:
   -standard form
   -scientific notation
   -words
2. Multiply and divide exponential expressions with the same base, without a calculator. (Review the laws of exponents: only integer (+ and -) exponents)
3. Multiply and divide numbers in scientific notation, without a calculator, without changing out of scientific notation.
4. Convert between linear units(inches to feet, feet to yards, yards to miles, meters to cm etc)
5. Convert between square units and units
6. Convert between cubic units and units
7. Find the area of a circle and a triangle and a quadrilateral.
8. Find the volume of a cylinder and a right prism.
9. Find the correct answer to problems like, "How high would $1,000 in nickels stacked reach? Give your answer in meters."
10. Determine approximately how many people can "crowd" into a given area by scaling up from a given or measured small space ratio.
11. Determine approximately how many____ (ex. golf balls) can fit into a given volume by scaling up from a given or measured small space ratio. (Note to teacher: find volume of golf ball, football, person, etc and determine how many it will take to fill a given space - classroom, trash can)
12. make a plan to make a Fermi estimate
13. specify what assumptions and what facts will be used when making Fermi estimate
14. carry out Fermi estimate plan
15. tell whether answers to Fermi problems are the same order of magnitude or not

fermi problems
assumption vs. facts
ratios

1. Determine assumptions made in order to make an approximation
2. Be able to understand the difference between an assumption and a fact
3. Determine if the solution found is REASONABLE

If time permits we will explore the following:

Logic And Fallacies

Fallacies covered:
Appeal to Popularity (appeal to majority, bandwagon), False Cause, Appeal to Ignorance, Hasty Generalization, Limited Choice (either-or fallacy), Appeal to Positive Emotion, Personal Attack (ad hominem), Begging the question (Circular Reasoning), Diversion (Red herring), Straw Man, Slippery Slope, False Authority, Gambler's Fallacy, Appeal to Negative Emotion (Scare-Tactic), Genetic Fallacy.

I can…
1) Identify the premise(s) and the conclusion in an argument.
2) Identify a deceptive argument and explain why it is deceptive. In other words, explain why the premises do not support the conclusion.
3) Identify when one of the 15 different fallacies on our list is displayed in a deceptive argument by naming the fallacy and explaining how it fits.
4) Identify when there is no fallacy in an argument.
5) Identify the hypothesis and conclusion of a conditional statement.
6) Write the converse, inverse and contrapositive of a conditional statement.
7) Identify when two conditional statements are logically equivalent.
8) Model an "All" "Some" or "None" conditional statement with a Venn diagram.
9) Model a set of conditional statements and statements with symbols.
10) Determine if an argument is valid or invalid.
11) Determine if an argument is sound or unsound.
12) Identify when and which of the laws of logic ((Modus Ponens (Affirming the Hypothesis), Law of Contrapositive, Modus Tollens (Denying the Conclusion), and Law of Syllogism (Chain of Conditionals)) are illustrated in a symbolic or written argument.
13) Apply the laws of logic ((Modus Ponens (Affirming the Hypothesis), Law of Contrapositive, Modus Tollens (Denying the Conclusion), and Law of Syllogism (Chain of Conditionals)) to a set of givens and, if possible, make a valid conclusion.
14) Explain why an argument is invalid.
15) Explain why an argument is unsound.