Algebra and Differential Calculus for Data Science
University of Colorado Boulder

Week 1
    Algebra Review - Review of algebra concepts including functions and logarithms
        Function Intro
        Domain and Range
        Piecewise functions
        What Can You Do to a Function? (add multiply forms of 0 and 1 to solve fn)
        Multiply Binomials (Polinomials) - (a+b)^2 = a^2 + 2ab + b^2
        Rationalizing Denominators
        Exponent Rules
        Logarithms
        Applications of Logarithms

Week 2
    Induction Proofs, Limits and Continuity-Simple induction proofs and limits at infinity for functions
        Induction Proofs
            Proof by Induction
        Limits at Infinity
        Limits at a Specific Point
        Continuity of a Function

Week 3
    Definition of a Derivative
        Intro to Derivatives
        Derivative of a Simple Function
            f(x) = -x^2 + 3x and f'(x) = -2x + 3
        Derivative of an Exponential Function
            What is the derivative of f(x)=5e^x -> 5e^x
        Derivative of a Constant
            f(x)=2, f'(x)=0
            f(x)=x^2 + 2, f'(x)=2x

        f(x)=x^3 -3x + 4e^x, f'(x)=3x^2 -3 + 4e^x

Week 4
    Product and Chain Rule -Use the product and chain rules to calculate the derivatives of more complicated functions.
        Product Rule Part 1
        Product Rule Part 2
        Quotient Rule
        Chain Rule

Week 5
    Using Derivatives to Graph Functions- Use where derivatives are positive and negative to help graph a function.
        Using the Derivative to Graph Functions Quiz
        Finding Concavity with the Second Derivative Quiz
        Comparing the Graphs of f(x) and f'(x) Quiz
        Graphing Functions - A More Complicated Example Quiz

Week 6
    Finding Maximums and Minimums - Use derivatives to find the maximum and minimum values of functions.
        Maxima and Minima of Functions
        Applications of Maxima and Minima
        Graphing Using Maxima and Minima
        Rate of Change