

MHF4U Final Project - Desmos Animated Design - Cultural Heritage

In this assignment, you will use your knowledge of advanced functions and the graphing calculator [desmos.com](https://www.desmos.com) to create an **animated design** that is inspired by **your cultural heritage**. You will also analyze some of the functions used and complete a summary table.

Due date: Friday Oct 21st, 2022 @ 12pm.

Ultimate Due date: Monday Oct 24th, 2022 @ 8:45am. Any late submission will not be accepted anymore.



The animated design must meet the following criteria:

- It is unique and your own work
- It must have a minimum of **10 functions**
- It includes at least one of each of the functions below:
 - A. Polynomial function (degree 3 or higher)
 - B. Exponential function
 - C. Logarithmic function
 - D. Trigonometric function
 - E. Rational function
 - F. A sum or difference function with at least one local maximum or minimum. The two functions added must be from two different categories A, B, C, D, E (eg. a trig & a rational)
 - G. A product function with at least one x intercept. The two functions multiplied must be from two different categories A, B, C, D, E (eg. a trig & a rational)
 - H. A quotient function. The two functions that are divided must be from two different categories A, B, C, D, E (eg. a trig & a rational)
 - I. A composite function. The inner and outer function must be from two different categories from the categories above A, B, C, D, E (eg. trig & a rational)
 - J. For the **10 functions**, you must NOT use functions linear, quadratic, absolute value functions.

Your task is:

- Watch the videos posted for support with your design and using desmos.com (30 minutes)
[Desmos Designs Playlist - YouTube](#)
- Use the desmos activity link to create your animated design.
- All functions used in your design must be organized into folders in Desmos by function type
- Complete the Summary Table on the next page.
- Add a copy of all the functions used in your summary table in the desmos folder “Summary Table”.
- Submit a pdf copy of the completed summary table in Moodle.

Important Note: *This is an evaluation that must be completed on your own with no help from tutors, friends or the internet. To earn full marks, you must justify your solution. Include the following as needed: Show diagram, Define variables, State formula, theorem, equation or function used, Show substitutions and or steps in solving an equation, State restrictions, State concluding statement, Use correct notation. No marks are given if your solution includes: e or $\ln$, differentiation, integration. This is an evaluation, make sure you are completing the work on your own.*

Summary Table

Use functions from your Desmos design to complete the summary table below.

1. A sum or difference of two functions with at least one max or min _____ Disregard desmos restrictions. Set sliders to 0 or 1 if needed	State the Local Max and Local Min. Justify your answer with reference to the graph of this function and the sign of IRC. Provide a sketch of your function.
2. A product of two functions with at least one x intercept _____ Disregard desmos restrictions. Set sliders to 0 or 1 if needed	Determine the x intercepts and y intercept. Justify your answer with calculations and show algebraic steps to determine the x intercepts and the y intercept.
3. A quotient of two functions _____ Disregard desmos restrictions. Set sliders to 0 or 1 if needed Very Important Note: $f(x) = \frac{\log x}{\sin x} + 5$ cannot be used in this summary table as it is not a quotient. $f(x) = \frac{\log x}{\sin x}$ can be used in the summary table	State the Domain, Range and vertical or horizontal Asymptotes. Justify your answer with reference to your equation and graph. Provide a sketch of your function.
4. A composite function _____ Disregard desmos restrictions. Set sliders to 0 or 1 if needed	Determine the Instantaneous Rate of Change at x=A Choose a value for A in the domain of your function and show full calculations. Is the function increasing at that point? How do you know? <i>No marks are given if your solution includes: e or ln, differentiation, integration.</i>

Marking Rubric:

	4 marks	3 marks	2 marks	1 mark	0
Use and notation of functions.	Every function is used at least once. Notation is correct.	Missing one or two functions. Notation is correct.	Three functions are missing. Notation is mostly correct.	Many functions are missing. Notation is incorrect.	Incomplete
Max/Min of sum/difference and intercepts of product functions	Max/Min of sum/difference and intercepts of product functions stated correctly and justified fully	Max/Min of sum/difference and intercepts of product functions stated correctly with some justification	Max/Min of sum/difference and intercepts of product functions stated correctly with no justification	Max/Min of sum/difference and intercepts of product functions stated incorrectly with no justification	Incomplete
Domain, range and asymptotes of quotient function and rate of change of composite functions	Domain, range and asymptotes of quotient function and rate of change of composite functions stated correctly and fully justified	Domain, range and asymptotes of quotient function and rate of change of composite functions stated correctly with some justification	Domain, range and asymptotes of quotient function and rate of change of composite functions stated correctly with no justification	Domain, range and asymptotes of quotient function and rate of change of composite functions stated incorrectly with no justification	Incomplete
Animation using sliders. Shading using inequalities. At least one slider and one inequality.	Work is presented with details, justified thoroughly with proper terminology. Sliders and Inequalities are used.	Work is presented with details, justified with mostly proper terminology. Sliders and Inequalities are used.	Work is presented with a few details, justified with incorrect terminology. Sliders or Inequalities are not used.	Work is presented with no details, justified with incorrect terminology. Sliders and Inequalities are not used.	No work shown.
Design Pattern Organization in Desmos Folders	A clear, meaningful design is present. All functions are organized in the corresponding folders in Desmos . Functions from summary table placed in separate folder without restrictions .	A clear design is present. All functions are organized in the corresponding folders in Desmos . Functions from summary table placed in separate folder without restrictions .	Some elements of a clear design are present. Most functions are organized in the corresponding folders in Desmos . Functions from summary table placed in separate folder without restrictions .	Few elements of a clear design are present. Few functions are organized in the corresponding folders in Desmos . Not all functions from the summary table are placed in a separate folder without restrictions .	No creative pattern. Functions not organized in folders in Desmos .