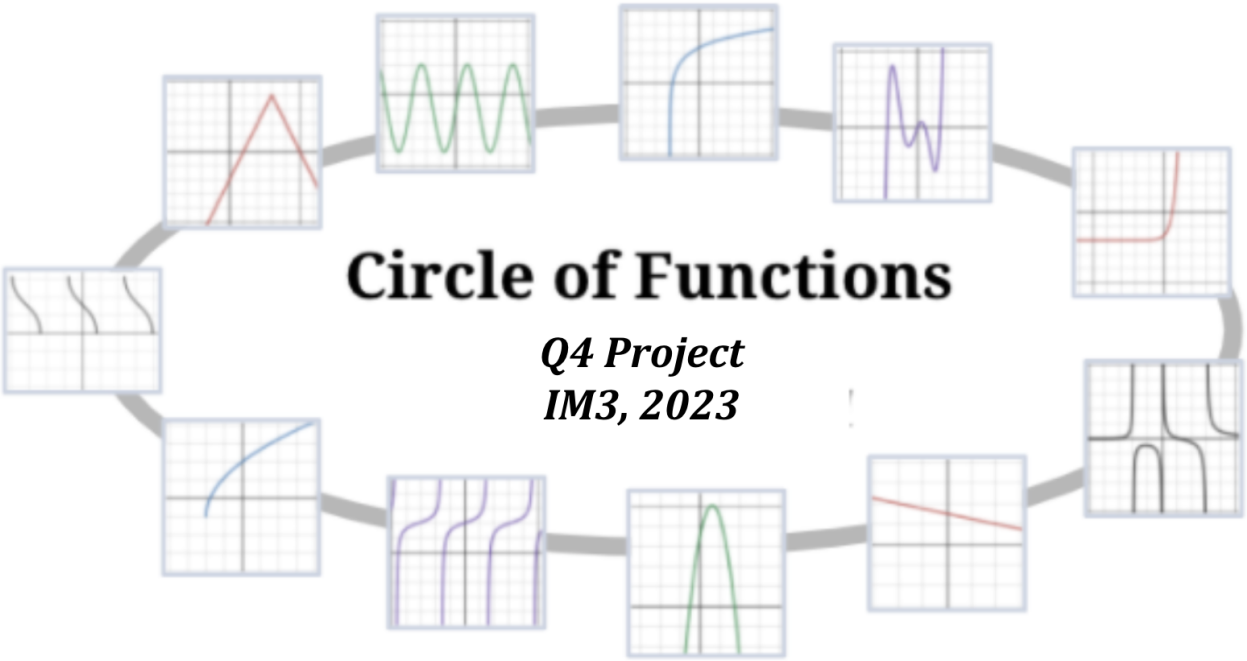

Circle of Functions

Q4 Project
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Dr. Jennifer Bruce
brucej@claytonbradleyacademy.org

Arielle Kennedy
kennedya@claytonbradleyacademy.org

For this project you will be making connections between all of the families of functions that you have studied in IM1, IM2, and IM3. To do this, you will be using attributes of these functions to link pairs of them together in a "circle".

You get to make the decisions about the specific equations for the functions, and which attribute to use to connect each function to the next one in the circle. This will require some thought and planning, so don't wait until the last minute to get started!

Restrictions:

- You may not use any parent functions (For example, $f(x) = x^2$ is the parent quadratic function). All functions used must have at least two transformations from the parent function.
- Your functions may be written in any form (standard, intercept, vertex, etc.)
- The attribute shared by the two functions must actually EXIST in both functions. For example, you cannot link a Linear function and an Exponential function with the attribute "Maximum/Minimum", because neither of those functions has a maximum or minimum value.

- The shared attribute must be shared EXACTLY. For example, you cannot link a quadratic function with a linear function using "*x*-intercept" if the linear function has only one *x*-intercept but the quadratic has two.

The functions and attributes that you will be using are (in no particular order):

FUNCTION TYPES	ATTRIBUTES
Linear (IM1)	Domain
Absolute Value (IM1)	Range
Quadratic (IM2)	x-intercept(s)
Cubic/Higher Degree Polynomial (IM3)	y-intercept
Square or Cube Root (IM2)	Maximum or Minimum
Exponential (IM1)	End Behavior
Logarithmic (IM3)	Vertical Asymptote
Simple Rational (IM3)	Horizontal Asymptote(s)
Rational (not simple) (IM3)	Transformations from parent function

Project Requirements:

1. This is an INDIVIDUAL project. There are infinitely many functions to choose from, and a wide variety of ways you could link them in a circle. As a result, your project should not closely resemble that of any other student in the class in appearance or in content.

2. You will produce a physical poster that shows your "Circle of Functions". I am open to other creative ideas for your "circle" that aren't posters, but please get that idea approved by me before you begin your work. If you choose to create a digital poster, you still must print it out and make a physical poster from it.

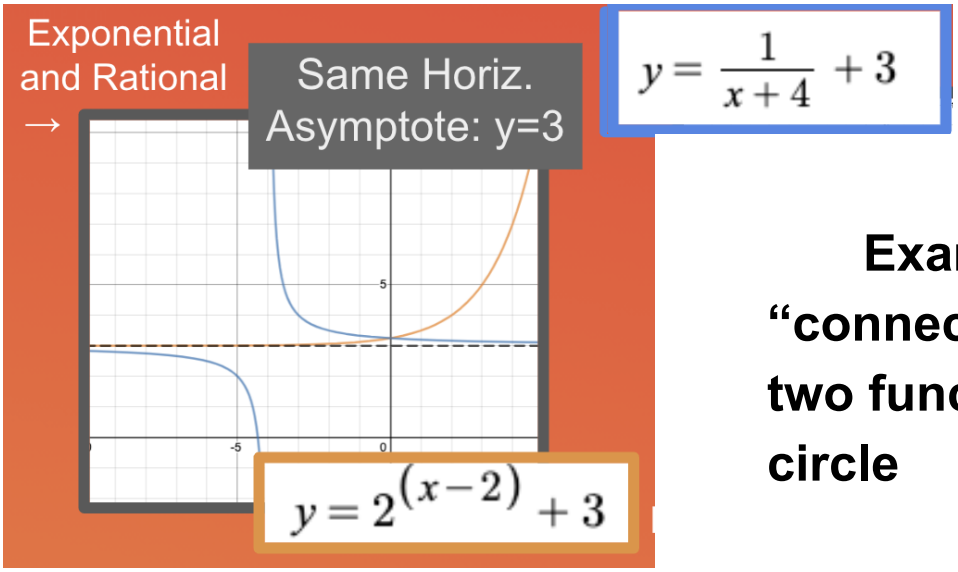
3. Students are responsible for the purchase of any materials needed for the poster. Colored paper for matting is available in the classroom, and Dr. Bruce will be happy to print out color copies of your functions.

4. On your poster, for each of the 9 functions in your circle, you must include:
    a. Typed equations for both functions (use Desmos for nice formatting).
    b. A single graph containing BOTH functions in Desmos, using an appropriate viewing window.
    c. The shared attribute CLEARLY LABELED in the graph.
    d. A description of the attribute the functions share.
    e. Algebraic or textual evidence that explains how each pair of neighboring functions shares the given attribute.

5. The attributes must be highlighted/labeled in some obvious way on each graph (use color, add points, asymptotes, and labels in Desmos).

6. A viewer should be able to look at your poster and understand the exact attribute that connects each function to the next/previous without any explanation from you.

7. Be prepared to present to an audience of your classmates, peers and other instructors. The presentation length is not specified, but you should be able to speak knowledgeably about your functions and their attributes.



Example of one "connection" between two functions in a the circle

Other Components Contributing to your Project Grade:

- Accuracy and clarity of the mathematics and notation
  - *Correct graphs for the equations provided*
  - *Appropriate windows that show the graph and its important attributes (don't zoom out too far or too close)*
  - *Paired functions actually share the claimed attribute*
  - *Functions are not parent functions, and have at least two transformations from the parent*
- Meeting all deadlines
- Appearance of your presentation:
  - Is it visually attractive and creative? Is it easy to read and understand? Does it look professional? (REMEMBER: use a paper cutter, include colored borders behind slides, and attach with rubber cement or spray adhesive!)
  - Use a large font - a viewer should be able to read everything on your poster from a reasonable distance away.
- Your presentation of the information on your poster/physical representation.
  - Are you able to succinctly describe your poster?
  - Can you clearly explain the attribute links between your functions and how you created two functions with that link?
  - Do you use proper vocabulary when presenting?
  - Can you answer questions regarding your topic?