Cubic Function Match b

Connect the Navigator computer to a data projector or Smart Board. Students will write functions to match the teacher graphs.

Teacher: **Begin Class** and using a calculator, Log In as Teacher
Students: Log In to Class
Teacher: Open **Activity Center**
                  Go to **File**, **Load**, **Load Activity Settings** and select *Activity Fcn Match 5*
                  Start Activity

Students: Enter **Activity Center**
                  Student (and Teacher) calculators will display: Y1=
                                                                        Y2=
                                                                        Y3=
                                                                        Y4=
                                                                        Y5=

Teacher: From the *teacher calculator* type **Y1= $(x + 5)^3$** and **Send**.

                  Allow students a moment to view the graph (hand-sketch the graph). Then from the *computer*:

                                                                        Pause Activity
                                                                        Extensions
                                                                        Quick Poll
                                                                        Poll Prompt

                  Submit **Open Response** question(s) similar to:

                              Describe some characteristic(s) of this function.
                              What is the domain of the function?
                              What is the range of the function?
                              Identify any intercepts.

                  Remind students that they may need to **Alpha Lock** in order to type what they intend and that they have a maximum of 20 characters – be brief. Ask students to **Send** their responses.

                  After each Quick Poll question, select **Stop Poll**. Look at **Poll Summary** and discuss student responses.

                  Exit **Quick Poll** and **Resume Activity**.

Students: Write a function in Y1 to match the graph on the screen. Students may resubmit the function until they find a match.

Teacher: After students have matched the function, from the *teacher calculator* type:

$$Y2= (x - 1)^3$$
$$Y3= (x - 5)^3$$

Ask students to quickly sketch the graphs (graphs may not be totally visible when **Quick Poll** is open).

From the *computer*:

Pause Activity
Extensions
Quick Poll
Poll Prompt

Submit an **Open Response** question similar to:

How are the three functions the same or different?
How are the functions the same or different from functions in *Cubic Function Match a*?
Does each of these functions have the same domain? Explain.
Does each of these functions have the same range? Explain.

Select **Stop Poll**. Look at **Poll Summary** and discuss student responses.

Exit **Quick Poll** and then **Resume Activity.**

Students: Write functions in Y2 and Y3 to match the other teacher graphs on the screen.

Teacher: After students have matched the functions, **Pause Activity** and ask students to write functions in Y4 and Y5 that will be visible on the screen. Graphs should replicate the three teacher graphs translated horizontally, one left of the three teacher graphs and the other right of the three teacher graphs.

Resume Activity

After student submissions **Pause Activity** and discuss any surprises students encountered and how they dealt with them. Are all student submissions the same two functions? Why or why not?

Stop Activity
Edit
Clear Activity Data

Reflect
Ask students to write a reflection on the mathematics of this exploration. Use this as a journal entry, notebook entry or an exit slip. How do you write a cubic function so that you can control the horizontal translation or horizontal shift? What is a common characteristic of each algebraic representation of the functions in this investigation? How does the algebraic representation of these functions differ from those in *Cubic Match a*? How does this difference affect the function graph?

Important Housekeeping Notes: The screen will become cluttered with student submissions and resubmissions. Use the computer to delete some incorrect submissions:

>**Select the graph to delete**
>**Delete**
>**Enter**

An alternative way to manage the clutter is clear all activity data:

>**Stop Activity**
>**Edit**
>**Clear Activity Data**
>**Start Activity**

Retype the teacher equations.