Absolute Value Function Match c

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= abs(*x* + 6) + 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.
                          How is this function different from those considered in the previous two investigations (*Absolute Value Function Matches a and b*)?

                          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. Deal with this absolute value family of functions in much the same way as with the quadratic and cubic families. Students may resubmit the function until they find a match.

Teacher: After students have matched the function, clear all activity data:

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

Type and **Send** the equations using the *teacher calculator*:

$$Y2 = abs(x + 2) - 3$$

Teacher: After students have matched the function, clear all activity data:

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

Type and **Send** the equations using the *teacher calculator*:

$$Y1 = abs(x + 6) + 3$$
$$Y2 = abs(x + 2) - 3$$
$$Y3 = abs(x - 5) + 3$$

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

How are the three functions the same or different?
How are these functions the same or different from the functions in the *Quadratic Function Matches or Cubic Function Matches*?
How are the functions the same or different from functions in *Absolute Value Function Matches a and b*?
Do these three functions have the same domain? Explain.
Do these three functions have the same range? Explain.
Which of the three functions have multiple *x*-intercepts or multiple *y*-intercepts?

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

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

Students: Write a function to match the function in Y3.

Teacher: After students have matched the function clear all activity data:

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

Type and **Send** the equations using the *teacher calculator*:

> **Y1= abs(x + 6) + 3**
> **Y2= abs(x + 2) - 3**
> **Y3= abs(x - 5) + 3**

Teacher: **Pause Activity** and ask students to write a function in Y4 that will plot a similar function translated farther down and right of the right-most teacher function and another function in Y5 that is farther up and left of the left-most teacher function.

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 either a journal entry, notebook entry or an exit slip. How is the algebraic representation of these functions different from those in *Absolute Value Matches* a and b? Discuss what controls how an absolute value function can be moved both horizontally and vertically (a diagonal translation). How could you use the algebraic representation of an absolute value function to discuss its positioning without looking at its graph? Compare the algebraic representation of these absolute value functions with the algebraic representations of the quadratic and cubic functions explored in the *Quadratic Function Match* and *Cubic Function*

Match explorations? Compare the domain and range of the absolute value family of functions to the domain and range of the quadratic family of functions. Compare the domain and range of the absolute value family of functions with the domain and range of the cubic family of functions. What other information would you like to share about this investigation?

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**

Alternate method to eliminate screen clutter:
This alternative way to manage the clutter was used twice in this activity (If all student submissions were always correct, this would be unnecessary.). Clear all activity data:

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

Retype the teacher equations.