

# Absolutely Wonderful!

**Introduction:** In this lesson, students will use Cabri Jr. and Activity Center to investigate absolute value functions. Students will submit lists to model, interpret, and generalize a relationship between the slopes of the branches of an absolute value function and the angle between the branches of an absolute value function.



## STEP 1: BEGIN CLASS SESSION

1. Open TI-Navigator™ on the computer.
2. Choose the appropriate class from the list of current classes and press **Begin Class** to begin the class session.
3. Have students log in to NavNet on their calculators



## STEP 2: CABRI JR.

1. Complete steps 1-5 using Cabri Jr. and the table on the student activity sheet.
2. Ask the students to select **1: ACTIVITY CENTER** from the Navigator Home Screen. Calculators will display the message “Waiting for Teacher.”



## STEP 3: ACTIVITY CENTER, LOADING DATA

1. Select the Activity Center icon and load activity settings using the File menu (use the file AbsolutelyWonderful.act).
2. Select the List Tab.
3. Press **Start Activity** to begin.
4. Ask the students to submit their lists. The list titled “Slope” is for the slope of the branches and the list titled, “Angle” is for the measure of the angle between the branches of the absolute value function.

5. Press **Pause Activity** to move on to the next step.

6. Use Quick Poll to ask the students what they think the graph will look like.



7. Select the graph tab to reveal the graph.
8. Ask the students to complete Question #1 on their handout.
9. Discuss the answers to Question #1 as a class.
10. Ask the students to complete steps 9-12. Allow them to work on their own if they are independent thinkers. Otherwise, complete steps 9-12 will them.
11. Press **Stop Activity**. Select the Equation tab. Configure the equations by selecting 1 equation per student and checking the following boxes: Let students view graphs of equations, and Send current graphs contents as background, and Empty Equations. Press **Start Activity**.
12. Ask the students to submit the equations they came up with.



## STEP 4: CLASS DISCUSSION

1. Discuss the equations submitted by the students. Determine why the equations match the data.
2. Ask the students to complete Questions 3 and 4.

**Related HSCEs:**

- A2.1.3** Represent functions in symbols, graphs, tables, diagrams, or words, and translate among representations.
- A2.1.4** Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise defined (e.g., absolute value and greatest integer functions).
- A2.3.1** A2.3.1 Identify a function as a member of a family of functions based on its symbolic or graphical representation; recognize that different families of functions have different asymptotic behavior at infinity, and describe these behaviors.
- A3.1.1** Identify the family of function best suited for modeling a given real-world situation.
- A3.1.2** Adapt the general symbolic form of a function to one that fits the specification of a given situation by using the information to replace arbitrary constants with numbers.
- A3.1.3** Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled.

**Teacher Notes**

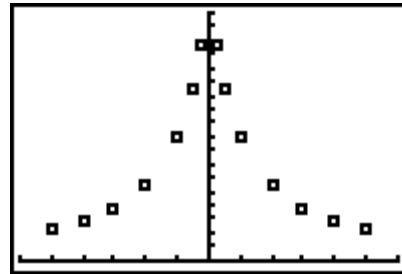
1. By graphing the slope of the absolute value function vs. the full angle measure, the following graph is produced using the window shown:

L1	L2	L3	3
1	90		
-1	90		
2	54		
-2	54		
3	36		
-3	36		
4	28		

L3(t)=

```

WINDOW
Xmin=6
Xmax=6
Xscl=1
Ymin=-1
Ymax=180
Yscl=10
Xres=1
    
```



2. This investigation concerns the family of functions  $f(x) = |ax|$ . The inverse tangent function can be used to find the measure of the angle between the branches of the absolute value function. The function is:

$$y = |2\tan^{-1}(1/a)|$$

where  $y$  is the measure of the angle between the branches of the absolute value function and  $a$  is the magnitude of the absolute value function.

