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Algebra 2
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Parent Functions and their Transformations

Goals:

The mathematics topic of function transformation is an important concept for students to learn. Learning function transformations not only can help our students better understand each function's behavior and function relationships, but can also aid them in learning more difficult mathematical concepts which are related to these earlier concepts in college. Studies have revealed that learning the function concept is complex, with many high performing students (e.g., students receiving a course grade of A in Calculus) possessing weak function understandings (Breidenbach, Dubinsky, Hawks, & Nichols, 1992; Carlson, 1998; Thompson, 1994 as cited in Oerhtman et al., 2008). Furthermore, through my past experiences, function transformation is seldom taught as an entire unit to be introduced to students and is most likely an additional section after the introduction of a specific function. The observation and research of how teachers approach and introduce these concepts to their students are very different, and the results of our students' learning levels also differ greatly. I think it is a good opportunity to reorganize the lesson sequence and find a way that can help our students to successfully learn this crucial concept.

Objective:

SWBAT identify 6 different parent functions
SWBAT to perform vertical translations and vertical stretches on these parent functions

Standard:

CCSS.MATH.CONTENT.HSF.BF.B.3

Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.

Formative Assessment:

Spot checks will be used to see if students are understanding the concept of vertical stretching and vertical translations. Questioning will also be used to gather if students are grasping the ideas. Whiteboard game will also be used to gather students understanding.

Summative Assessment:

A quiz on parent functions and their transformations will be given in class. The quiz is closed notes, but students are given time to review before the quiz and can ask questions.

Materials:

- Interactive Notebooks
- Calculators
- Pencils
- Whiteboards (4)
- Expo Markers (4)

Procedures:Warmup (10 minutes)

Students will be:

- Entering classroom
- Getting folders and writing utensil
- Taking their seats
- Working on warmup alone or with group

Teacher will be:

- Greeting students
- Taking attendance
- Providing support

Grading Warmup (5 minutes)

Students will be:

- Correcting their work

Teacher will be:

- Providing solution on the board

Lecture (20 minutes)

Students will be:

- Taking notes
- Working alone or with a partner to solve given examples

Teacher will be:

- Review parent functions
- Review vertical translations and stretches

- Posit question of different translations and stretches
- Discuss student responses
- Introduce product rule.
- Provide examples and solve
- Provide examples for the students to solve in their notes

Whiteboard game (15 minutes)

Teacher will lead whiteboard game and have 20 questions for groups to solve. Extra credit on the midterm will be given out as follows to the groups:

1st Place: 5 points

2nd Place: 4 points

3rd Place: 3 points

4th Place: 2 Points

Exit Ticket (5 minutes)

Teacher will hand out sticky notes and students will solve two problems before leaving class.