

## **TI-Nspire Activity**

NCAA Tournaments: Discovering Exponential Functions

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## **Activity Overview**

In this activity, students will begin by discussing the NCAA tournaments – particularly the elimination process and how ultimately only one team is chosen as a champion. Students will use their knowledge of tables and graphs to discover concepts of exponential functions and restrictions on the domain and range of those functions.

**Concepts:** Tennessee Algebra I Standards

- 3102.3.33 Recognize data that can be modeled by an exponential function.
- 3102.3.34 Graph exponential functions in the form  $y = a(b)^x$  where  $b \neq 0$ .
- 3102.3.35 Apply growth/decay to solve contextual problems.

## **Teacher Preparation**

Students should be familiar with basic Nspire applications. A blank NCAA bracket sheet is attached for student use; however, if it is tournament time, the teacher may want to find a current bracket with teams' names listed.

## **The Classroom**

Students should work alone or in pairs.

## **TI-Nspire Applications**

Lists and Spreadsheet, Data and Statistics

## **Assessment and Evaluation**

The teacher may want to follow with a lesson on how changing constants and/or coefficients can also affect the graph in a non-contextual situation. Teachers may also find it important to find the domain and range of such functions.

## STEP-BY-STEP INSTRUCTIONS

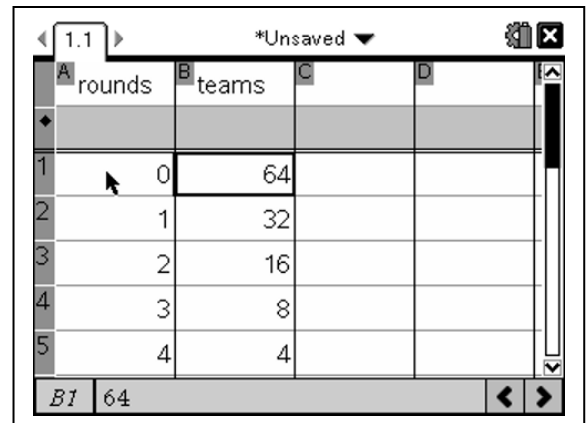
The National Collegiate Athletic Association (NCAA) holds an annual basketball tournament. The nation's top 64 teams in Division I are invited to play each spring. When a team loses, it is out of the tournament.

1. Allow students to discuss the games and bracket sheet (attached) of the NCAA tournament.
2. a. Copy, complete and extend the table until only one team is left.

Rounds Played (x)	Number of Teams Left in Tournament (y)
0	64
1	
2	

b. How many rounds of games must be played?

3. Create a new document by pressing the Home (⌂) button and then choose 1: New Document. Choose Lists and Spreadsheets.
4. In column A, type **rounds**.
5. Arrow down to cell A1 and enter the data. Be sure to hit the  $\text{enter}$  key after each value.
6. In column B, type **teams** then enter the data for the number of teams.
7. Press  $\text{2nd}$  and add a Data & Statistics page.
8. Use the Nav Pad to move over the area at the bottom of the screen that reads "click to add variable". Use the select ( $\text{2nd}$ ) tool to choose "rounds" as your horizontal variable.
9. Likewise use the Nav Pad to move to the area on the left of the screen until "click to add variable" appears. Use the select tool to choose "teams" as the vertical label.



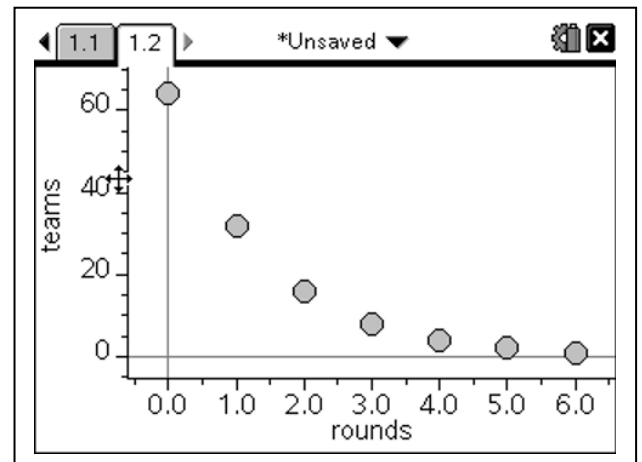
10. Does the graph represent a linear function? Explain.

11. Find the regression for the function. Press  $\text{\textcircled{menu}}$  4 Analyze. Choose 6: Regression.

12. Then choose 8: Show Exponential Regression.

The exponential regression should be given for the graph of this function.

The equation of the function should be of the form  $y = a(b)^x$  where  $b > 0$  and  $b \neq 1$ . The “a” value represents the initial value of the function and must be greater than zero. In this problem the “a” value is 64 since there are 64 games initially. The “b” value is called a growth or decay factor. It describes what is taking place to the initial value. If it is greater than one then it is considered a growth factor. For example, an ant farm increases by 25% each day then the growth factor would be 1.25 (100% + 25%). Similarly if the factor is between zero and one it is a decay factor. For example, if a car depreciates by 10% of its value each year then the decay factor would be 0.90 (100% - 90%).



13. Write the equation given by this regression. \_\_\_\_\_

**Open and read the document titled *ExponentialFunctions.TNS* then answer the question.**

14. Does the graph of the NCAA Tournaments represent an exponential growth or decay? \_\_\_\_\_ Explain.