

# Inverse, Exponential, and Logarithmic Functions: A Graphing Calculator Race

For this activity, you'll be working in teams of two (i.e., pairs) and using TI-83 Plus or TI-84 Plus graphing calculators. The object is to identify functions by looking at their graphs. You have a list of 16 functions to graph/identify. They appear roughly in order of increasing difficulty.

In each pair, one person will start out entering functions on the calculator, and the other will start trying to identify them. Each team will be competing against all the others to see who can identify the most in the time we have—probably about 15 minutes. You should swap roles after the first eight.

Identifying functions from their graphs can be ridiculously difficult. These aren't all easy, but they aren't too tricky! ...I hope.

## Calculator Knowledge Required

You'll need to enter (in the "Y=" screen) equations involving:

- exponentials with any base: use  $nnn^{xxx}$ , where "nnn" is the base and "xxx" the exponent
- common and natural logarithms: use the **LOG** and **LN** keys, respectively
- absolute value: use **MATH** > **right-arrow** to select the abs function; then **ENTER**.

See list of equations on the other side. When you're done, use the **CLEAR** button to remove the equation before going on to the next one.

If you need help, please ask.

## Calculator Setup

Your calculator should be set up this way.

**WINDOW:** Xmin = -5, Xmax = +5, Ymin = -5, Ymax = 5.

**2<sup>ND</sup> FORMAT:** GridOn

If it's not and you don't know how to do it, ask for help!

## Directions

Step 1. Chooser: Choose one of the functions below for your partner to identify. Enter it in the Y= screen, then hit **GRAPH**.

Step 2. Guesser: Figure out which of these functions you're looking at a graph of.

Step 3. Chooser: When the guesser has correctly identified the function, check it off, and hit **CLEAR**. Then go back to the first step.

## List of Functions

\_ 1.  $y = 2x + 1$

\_ 2.  $y = 2^x$

\_ 3.  $y = \left(\frac{6}{5}\right)^x$

\_ 4.  $y = 3^x$

\_ 5.  $y = \left(\frac{5}{6}\right)^x$

\_ 6.  $y = \frac{3}{2}(2^x) + 1$

\_ 7.  $y = x^3$

\_ 8.  $y = x^{1/3}$

\_ 9.  $y = \log x$

\_ 10.  $y = \ln x$

\_ 11.  $y = \text{abs}(\log x)$

\_ 12.  $y = \log(\text{abs}(x))$

\_ 13.  $y = -\text{abs}(\log(-x))$

\_ 14.  $y = \text{abs}(2^x - 2)$

\_ 15.  $y = \text{abs}(2^{x-2} - 2)$

\_ 16.  $y = -\text{abs}(x + 1)^{1/3}$