## Class \_\_\_\_\_

## **Discovering Exponent Rules**

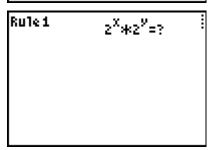
Run the **EXPRULES** program by pressing <u>PRGM</u> then choosing it from the menu and pressing <u>ENTER</u>.

This program allows you to explore 6 different rules of exponents by helping you evaluate exponential expressions for different values of *x* and *y*. To begin, choose **Experiment**, then type **1** to explore Rule 1.

The program displays the expression that you will be calculating to explore Rule 1,  $2^x 2^y$ . Calculate the expression several times, choosing values from 1 through 8 for x and y. Make and test a conjecture.

Repeat this process to explore rules 2-6. Pay attention to the prompts, as some rules require you to enter negative values for the variables. Record your conjectures below.





- Rule 1: Make a rule for the product of two powers with like bases.
- Rule 2: Make a rule for the quotient of two powers with like bases.
- Rule 3: Make a rule for the power of a power.
- Rule 4: Make a rule for a power with a negative exponent.
- Rule 5: Make a rule for a power with a zero exponent.
- Rule 6: Make a rule for the power of a quotient.

## Extension

Use your calculator to evaluate each of the expressions shown.

Then make a conjecture for  $m^{\frac{1}{n}}$ .

$$36^{\frac{1}{2}} =$$
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$$8^{\frac{1}{3}} =$$
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$$49^{\frac{1}{2}} =$$

$$16^{\frac{1}{2}} =$$

$$16^{\frac{1}{4}} =$$
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Complete:  $m^{\frac{1}{n}} =$