

Unit 4 Lesson 11: Evaluating Logarithmic Expressions

1 Math Talk: Finding Values (Warm up)

Student Task Statement

Evaluate mentally.

1. $\log 10$

2. $\log 10,000$

3. $\log 0.1$

4. $\log \frac{1}{1,000}$

2 Log War!

Student Task Statement

Have you played the game of war with a deck of playing cards?

Your teacher will give you and your partner a set of special cards.

- Shuffle and deal the cards evenly.
- Each player turns one card face up. The card with the greater value wins the round and its player captures both cards and sets them aside.
- If you and your partner disagree about the value of a card, discuss until you reach an agreement.
- If there is a tie, each player turns another card face up. The player whose card has the greater value captures all cards (including the cards that tie).
- Play until all the cards are turned up. The player with the most cards wins.

Let the logarithm war begin!

3 Finding Logarithms with a Calculator

Student Task Statement

- To solve the equation $10^m = 19$, Tyler writes the equation in the logarithmic form:
 $m = \log_{10} 19$. He then presses the “log” button on the calculator, enters the number “19,” and writes down an approximation of 1.279. Priya follows the same steps on her calculator and writes down 1.27875.
 - Experiment with your calculator until you understand how to evaluate $\log_{10} 19$. What value do you see on the calculator?
 - Discuss with a partner: Why might $\log_{10} 19$ be expressed in different ways?
- Express the solution to each equation using a logarithm. Next, find the approximate value of the solution using a calculator.
 - $10^m = 24$
 - $10^n = 750$
- Estimate the value of each expression. Explain to a partner how you made your estimate. Next, check your estimate with a calculator.
 - $\log 90$
 - $\log 1,005$
 - $\log 9$