WP: Represent a situation using a 1-variable exponential equation

Problem

Fenella competed in a chess tournament with 128 entrants. In each round of competition, half of the entrants were eliminated. At the end of r rounds, there were 16 entrants left. Write an exponential equation that could be used to find which round, r, this would be.

Step 1

Write an expression in $a(b)^r$ form that represents the number of entrants left after each round.

The round is represented by r.

Recall that a represents the initial value. There were 128 entrants in the tournament, so $a = 128$.

Recall that b represents the factor that the quantity changes by. Half of the entrants were eliminated in each round, so $b = \frac{1}{2}$.

The number of entrants left after r rounds is represented by $128\left(\frac{1}{2}\right)^r$.

Step 2

Write an equation that could be used to find the round after which 16 entrants were left. Set the expression equal to 16.

$$128\left(\frac{1}{2}\right)^r = 16$$

Answer

$$128\left(\frac{1}{2}\right)^r = 16$$

© 2014 by Renaissance Learning, Inc. All rights reserved.
Reproduction for educational use by Accelerated Math licensees and their educators, students, and parents allowed.