Exponential Relations – Day 2: Negative and Zero Exponents

Expanded Form Investigation

For each expression given below.

1. Evaluate the expression using the exponent rules learned in the previous lesson.
2. Rewrite your powers in power form.
3. Rewrite the **original** expression in expanded form.
4. Cancel out any values that can be canceled and rewrite the expanded form expression in power form with no zero or negative exponents and without using decimals.
5. Verify your rules from #4 and #6 of the Minds On by comparing your power from #2 above and your power form with no negative or zero exponents from #4 above.

Expression	Evaluation Using Exponent Rules	Evaluation Using Expanded Form
$5^4 \div 5^2$	$= 5^{4-2}$ $= 5^2$	$= \dfrac{5 \times 5 \times 5 \times 5}{5 \times 5}$ $= 5^2$
$4^5 \div 4^5$	$= 4^{5-5}$ $= 4^0$ $= 1$	$= \dfrac{4 \times 4 \times 4 \times 4 \times 4}{4 \times 4 \times 4 \times 4 \times 4}$ $= 1$
$(-2)^7 \div (-2)^7$	$= (-2)^{7-7}$ $= (-2)^0$ $= 1$	$\dfrac{(-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2)}{(-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2)} = 1$ $= 1$
$3^3 \div 3^4$	$= 3^{3-4}$ $= 3^{-1} \left[= \dfrac{1}{3^1}\right]$	$\dfrac{3 \times 3 \times 3}{3 \times 3 \times 3 \times 3} = \dfrac{1}{3}$
$5^4 \div 5^7$	$= 5^{4-7}$ $= 5^{-3}$ $= \dfrac{1}{5^3} = \dfrac{1}{125}$	$\dfrac{5 \times 5 \times 5 \times 5}{5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5} = \dfrac{1}{5^3}$ $= \dfrac{1}{125}$
$2^6 \div 2^{10}$	$= 2^{6-10}$ $= 2^{-4}$ $= \dfrac{1}{2^4} = \dfrac{1}{16}$	$\dfrac{2 \times 2 \times 2 \times 2 \times 2 \times 2}{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2} = \dfrac{1}{2^4}$ $= \dfrac{1}{16}$