# Complex Negative Exponents Lesson

Simplify the exponent:  $\dfrac{1}{3^{-4}}$

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**Step 1) Understand what the denominator is saying.**

Let's just focus on the denominator for now.                $3^{-4}$

In a negative exponent, the **base number** tells the number we are dividing by and the **exponent** tells us how many times we are dividing that number.

Looking at our problem, we are dividing by **3** four times.

$3^{-4} = 1 \bullet \dfrac{1}{3} \bullet \dfrac{1}{3} \bullet \dfrac{1}{3} \bullet \dfrac{1}{3} = \dfrac{1}{81}$

**Step 2) Restate the problem with the denominator:**

$\dfrac{1}{\frac{1}{81}}$

**When we set this problem up again, we can see that a 1 over a 1 over fraction is equal to the reciprocal of the fraction.**

$\dfrac{1}{\frac{1}{81}} = 81$