NWEA Assessment Item Illustrating 8.EE.A.1

Domain: Expressions and Equations
8.EE.A: Work with radicals and integer exponents.
Calculator Availability: No

Use the equation to answer the question.

$10^{16} \times 10^{-20} = 10^{x}$

What value of x makes the equation true? Enter the answer in the box.

Alignment: 8.EE.A.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.*

The inclusion of integer exponents and properties of exponents sets this standard apart from the definition of exponents established in earlier grades. Students must understand that the properties of exponents hold for both positive and negative integers. In this item, students apply the product-of-powers property and use the fact that because the bases are the same, the exponents are added. By using a familiar base (10), this item attends specifically to the properties of exponents and not to the evaluation of the numerical expression.

Coherence: Students were first introduced to exponents in grade 5 when they represented powers of 10 with whole-number exponents.[5.NBT.A.2] By including negative integers as exponents, this item illustrates how the grade 8 work with exponents builds upon the work with whole-number exponents from grade 6 and grade 7. By becoming familiar with and practicing the application of exponent properties, students are well positioned to perform operations with numbers expressed in scientific notation.[8.EE.A.4] In high school, students will learn the properties of rational exponents[HSN-RN.A] and reason with quantities expressed in scientific notation.[HSN-Q.A]

Rigor: This item attends to procedural skill. Without using a calculator, students apply their knowledge of the properties of integer exponents to solve this problem.

Answer Key:

Use the equation to answer the question.

$10^{16} \times 10^{-20} = 10^{x}$

What value of x makes the equation true? Enter the answer in the box.

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