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| **Content: Expressions and Equations** | **Grade Level: 8** |
| **Standard: 8.EE.1**Know and apply the properties of integer exponents to generate equivalent **numerical** expressions. For example, $3^{2}• 3^{-5}= 3^{-3}= \frac{1}{3^{3}}= \frac{1}{27}$. |
| **I can:**use laws of exponents to simplify numerical expressions.* Negative Exponent Property $a^{-b}=\frac{1}{a^{b}} , a\ne 0$

 * Power of a Power Property $\left(a^{b}\right)^{c}= a^{bc}$
* Zero Exponent Property $a^{0}=1, \left(a \ne 0\right)$

 * Product of Powers Property $a^{b}• a^{c}= a^{\left(b+c\right)} , a \ne 0$
* Quotient of Powers Property $\frac{a^{b}}{a^{c}}= a^{b-c} , a \ne 0$
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| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.****For example:*** problems involving variables & coefficients
* problems that require critical thinking to generalize the properties
 | **Sample Activities** |
| * Find two numbers that satisfy the equation $\frac{7^{x}}{7^{y}}= 7^{3}$ and explain your reasoning.
* $\frac{12s^{-1} • 4^{-2} • r^{3}}{s^{2} • r^{5}}$
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|  | **3.5** | In addition to achieving level 3.0 content, students have partial success with level 4.0 content. |  |
| **Score 3.0** | **The student:*** knows and applies **all five** properties of integer exponents to generate equivalent **numerical** expressions.
* applies more than one property of exponents to simplify multi-step expressions.
* solves word problems involving properties of exponents.

**The student exhibits no major errors or omissions.** | * $\frac{5^{3}• 5^{4}}{5^{2}}$
* $\frac{\left(7^{3}\right)^{2}}{7^{8}}$
* $\frac{\left(8^{2}\right)^{4}}{8^{8}}$
 |
|  | **2.5** | Knows and applies **all five** properties of integer exponents in problems involving **only one** property at a time.  |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** knows and applies **some** properties of integer exponents to generate equivalent **numerical** expressions.
* applies one property of exponents to simplify single step expressions.

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** | * $5^{0}$
* $3^{-4}$
* $8^{2}• 8^{4}$
* $\frac{12^{3}}{12^{1}}$
* $\left(6^{3}\right)^{3}$
 |
|  | **1.5** | Partial knowledge of the 2.0 content, but major errors or omissions regarding the 3.0 content. |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content, but not the 3.0 content. |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |