**Math 9 Lesson 2-5 Exponent Laws (Part 2)**

**Power of a Power…**

We saw yesterday how to simplify powers when we multiply the same base. What happens when we have repeated multiplication of the same power? (ie. A power raised to a power) The key to simplifying lies in practising the expanded form of the power.

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| **Expression to be simplified** | **Work it out (expanded form)** | **End result (power form)** |
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**Describe the pattern in your own words.**

**Power of a Power**

To raise a power to a power**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Power of a Product**

Sometimes the base of a power may be a product, for example We can use the commutative property of multiplication (repeatedly) which says that the order which I multiply two numbers doesn’t matter.

Example:

The value is the same regardless of the order, so if I rearranged the numbers it would still give the same result.

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| **Expression to be simplified** | **Work it out (expanded form)** | **End result (power form)** |
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**What is the pattern you see in the table?**

**Exponent Law for Power of a Product**

*a* and *b* are any integers, except 0.

*m* is any whole number.

**Exponent Law for Power Of a Quotient**

These problems also use multiplication of powers , but also multiplication of fractions. Recall we multiply two fractions by multiplying the tops and bottoms separately. For instance,

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| --- | --- | --- | --- |
| **Expression to be simplified** | **Work it out (expanded form)** | **End result (power form)** | **Standard Form** |
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What is the pattern you see?

Exponent Law for Power of a Quotient

Where *a* and *b* are any integers, but *b* cannot be 0.

*n* is any whole number.

Does this rule work for ? Explain. If so, what do you get as the end result?

So now how do we put these rules all together?

Evaluate the following.

a) b)

c) d)

e) f)

2. Why do you add the exponents to simplify , but multiply the exponents to simplify the expression ?

3. What is the difference between a quotient of powers and a power of a quotient?

4. What is the difference between a product of powers and a power of a product?

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