**Vocabulary:**


| Exponent Rule | Definition | Example |
|---|---|---|
| **Product of Powers:** $a^m \bullet a^n = a^{m+n}$ | If multiplying two numbers with the **same base**, **ADD** the exponents. | $y^4 \bullet y^3 \bullet y^1 = y^8$<br>$(7y^5)(6y)$<br>$7 \cdot 6 \cdot y^5 \cdot y = 42y^6$ |
| **Quotient of Powers:** $\frac{a^m}{a^n} = a^{m-n}$ | If dividing two numbers with the **same base**, **SUBTRACT** the exponents. | $\frac{6^{13}}{6^2} = 6^{11}$<br>$\frac{10a^7b^9}{15a^5b^9} = \frac{2a^2}{3}$ |

Feb 27-8:07 AM

| | | |
|---|---|---|
| **Power of a Power:** $(a^m)^n = a^{m \bullet n}$ | If raising a power to a power, **multiply** the exponents. | $(x^2)^8 = x^{16}$<br>$(y^{-3})^{-4} = y^{12}$ |
| **Power of a Product:** $(ab)^m = a^m b^m$ | **Distribute** power to each factor in parenthesis, and then **multiply**. | $(4x^3yz)^3 = 4^3x^9y^3z^3$<br>$64x^9y^3z^3$<br>$(7xy^{-2})^{-2}$ |

Feb 27-8:07 AM

| **Power of a Quotient:** $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ | **Raise both** the numerator and denominator to the power. | $\left(\frac{2a^5}{b^7}\right)^2$ $\frac{2^2 a^{10}}{b^{14}}$ $\frac{4a^{10}}{b^{14}}$ |
|---|---|---|
| **Rules to Remember:** * | $a^0 = 1$ | $a^{-n} = \frac{1}{a^n}$ |

Feb 27-8:08 AM

**Applying Exponential Properties to Exponential Equations INTRO:**

1. Write the exponential form of the expression 2 x 2 x 2 x 2 x 2 = $2^5$

2. Evaluate $2^5$ = 32

3. Therefore 32 = $2^5$

Feb 27-8:08 AM

Rule: In order to solve exponential functions, each power must have the **same base**.

**If $B^m = B^n$, then m = n.**

Consider the following exponential function: $2^{x+6} = 32$

$32 = 2^5$

We can re-write the exponential equation by creating like bases:

$2^{x+6} = 32$

$2^{x+6} = 2^5$ → $2^{(-1+6)} = 2^5$

Therefore: $x + 6 = 5$

$X = -1$

Feb 27-8:09 AM

Practice:

1. $9^{2x-5} = 27$

$(3^2)^{2x-5} = 3^3$

$3^{2(2x-5)} = 3^3$

$2(2x-5) = 3$

$4x - 10 = 3$

$4x = 13$

$X = \frac{13}{4}$

2. $8^{x-1} = 2^{x+2}$

$(2^3)^{x-1} = 2^{x+2}$

$2^{3(x-1)} = 2^{x+2}$

$3x - 3 = x + 2$

$2x = 5$

$x = \frac{5}{2}$

3. $36^{2x} = 216^{x-1}$

$(6^2)^{2x} = (6^3)^{x-1}$

$6^{2(2x)} = 6^{3(x-1)}$

$4x = 3x - 3$

$X = -3$

Feb 27-8:09 AM