

100 Well Done

Date: 10/17/2011

# My Algebra Success Guide

**TOPIC**  
Exponents

**SECTION**  
5.1

**PAGE(S)**  
301 - 310

**KEY ALGEBRA CONCEPT**

1. Evaluate exponential expressions
2. Use product rule for exponents
3. Use power rule for exponents
4. Use the power rules for products and quotients.
5. Use quotient rule for exponents, and define a number raised to the 0 power.
6. Decide which rule(s) to use to simplify an expression.

**KEY FORMULAS**

- Product Rule: If  $m$  and  $n$  are positive integers and  $a$  is a real #, then  $a^m \cdot a^n = a^{m+n}$
- Power Rule: If  $m$  and  $n$  are positive integers and  $a$  is a real #, then  $(a^m)^n = a^{mn}$
- Power of Product Rule: If  $n$  is a positive integer and  $a$  and  $b$  are real #s, then  $(ab)^n = a^n b^n$
- Zero Exponent:  $a^0 = 1$  as long as  $a \neq 0$
- Power of a Quotient Rule: If  $n$  is a positive integer and  $a$  and  $c$  are real #s, then  $(a/c)^n = \frac{a^n}{c^n}, c \neq 0$
- Quotient Rule: If  $m$  and  $n$  are positive integers and  $a$  is a real #, then  $\frac{a^m}{a^n} = a^{m-n}$

**EXAMPLE**

#12  $(-1/9)^2$   
 $-1/9 \cdot -1/9 = 1/81$

#29  
 $(-3)^3 \cdot (-3)^9$   
 $-3 \cdot -3 \cdot -3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$   
 3 factors of -3    9 factors of -3  
 $3+9$   
 $-3^{12}$

#49 ~~WAAAA~~  $(-7a^2b^5c)^2$   
 $(-7)^2 \cdot (a^2)^2 \cdot (b^5)^2 \cdot (c^1)^2$   
 $-49a^4b^{10}c^2$

continued on back

**PROCESS(STEPS)/NOTES**

#12  
 1. multiply the base by itself two times  
 2. negative times a negative is a positive

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#29  
 1. Add exponents  
 2. keep common base

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#49  
 1. raise each variable to the 2nd power  
 2. Follow power rule for exponents (multiply each exponent of a variable by the distributed exponent) ex.  $(a^2)^2 = 2 \cdot 2 = 4 = a^4$

continued on back

### EXAMPLE (CONTINUED)

$$\# 6^4 \frac{(-6)^{13}}{(-6)^{11}}$$

$$13 - 11 = 2$$

$$(-6)^2 = 36$$

$$\# 102 \left(\frac{2ab}{4yz}\right)^4$$

$$\frac{(2)^4 (a)^4 (b)^4}{(4)^4 (y)^4 (z)^4} = \frac{16a^4b^4}{1296y^4z^4}$$

### PROCESS/NOTES (CONTINUED)

# 6<sup>4</sup>

1. Subtract the denominator's exponent from the numerator's exponent
2. multiply the base times the exponent
3. you can not simplify a quotient when there are two different bases. ex.  
 $5^2/4^3$

# 102

1. use power of product rule  $(ab)^n = a^n b^n$  for both the numerator and the denominator