

# Investigation: Properties of Exponents

Use expanded form to review and generalize the properties of exponents.

## Rule 1 - Product property of exponents

Write each product in expanded form, then write it in exponential form. Compare the original exponential form with the final answer in exponential form.

a.  $4^3 \times 4^4$

b.  $t^5 \times t^7$

c.  $7^{10} \times 7^2$

Generalize your results:  $a^m \times a^n =$  \_\_\_\_\_

---

## Rule 2 - Quotient property of exponents

Write the numerator and denominator of each quotient in expanded form. Reduce by eliminating common factors, and then rewrite the remaining factors in exponential form. Compare the original exponential form with the final answer in exponential form.

a.  $\frac{4^4}{4^3}$

b.  $\frac{8^7}{8^5}$

c.  $\frac{7^{10}}{7^2}$

Generalize your results:  $\frac{a^m}{a^n} =$  \_\_\_\_\_

---

## Rule 3 - Power of a power property of exponents

Expand each expression, and then rewrite in exponential form. Compare the original exponential form with the final answer in exponential form.

a.  $(4^3)^4$

b.  $(t^7)^5$

c.  $(7^{10})^2$

Generalize your results:  $(a^m)^n =$  \_\_\_\_\_

---

**Rule 4 - Power of a product property of exponents**

Expand each expression, and then rewrite in exponential form. Do not multiply within the parentheses.

a.  $(4 \times 3)^4$

b.  $(t \times 8^2)^5$

c.  $(7^5 \times t^3)^3$

Generalize your results:  $(a^m \times b^n)^p = \underline{\hspace{2cm}}$

---