Math 9
Exponent Laws Discovery

Name: _____
Date: _____

Write each expression in expanded form, then simplify to a single power.

Expression	Expanded Form	Single Power
$2^2 \times 2^3$	$\underline{2 \times 2} \times \underline{2 \times 2 \times 2}$	2^5
$(-3)^4 \times (-3)^2$		
$5^2 \times 5^4 \times 5^3$		
$(10^3)(10)$		
$(x^2)(x^5)$		

Compare the exponents in each expression with the exponent in the single power.
What relationship do you see? Can you complete the exponent law below?

EXPONENT LAW – Product of Powers

- When multiplying powers with the same base, _____ the exponents to write the product as a single power.

Write each expression in expanded form, then simplify to a single power.

Expression	Expanded Form	Single Power
$(5^2)^4$	$\underline{5 \times 5} \times \underline{5 \times 5} \times \underline{5 \times 5} \times \underline{5 \times 5}$	5^8
$(9^4)^2$		
$[(-4)^2]^3$		
$(y^3)^3$		
$(w^5)^2$		

Look back at the table at the bottom of the front page. Compare the exponents in each expression with the exponent in the single power.
What relationship do you see? Can you complete the exponent law below?

EXPONENT LAW – <u>Power to a Power</u>

- When a power is raised to an exponent, _____ the exponents to write the expression with a single exponent

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Write each expression in expanded form, then simplify to a single power.

Expression	Expanded Form	Single Power
$11^5 \div 11^4$	$\dfrac{11 \times 11 \times 11 \times 11 \times 11}{11 \times 11 \times 11 \times 11}$	11^1
$(-6)^4 \div (-6)^2$		
$2^8 \div 2$		
$7^8 \div 7^5$		
$a^7 \div a^3$		

Compare the exponents in each expression with the exponent in the single power.
What relationship do you see? Can you complete the exponent law below?

EXPONENT LAW – <u>Quotient of Powers</u>

- When dividing powers with the same base, _____ the exponents to write the quotient as a single power.