

Algebra 1 – Unit 6

Name: _____

Laws of Exponents, Day 2 – Powers

$$(xxxxxxx) \cdot (xxxxxxx) = x^{14}$$

Power of a Power	When raising a power to a power, MULTIPLY the exponents.	Example: $(x^7)^2 = x^{14}$ $(x^7)(x^7)$
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Using the Power of a Power rule (multiplying exponents), simplify the expressions below.

$$(m^7)^4 = \overset{7 \cdot 4}{m^{28}} = m^{28}$$

$$(y^3)^2 = \overset{3 \cdot 2}{y^6} = y^6$$

$$(w^5)^3 = \overset{5 \cdot 3}{w^{15}} = w^{15}$$

$$(3^4)^2 = \overset{4 \cdot 2}{3^8} = 3^8 \text{ (6,561)}$$

$$(c^3)^4 = \overset{3 \cdot 4}{c^{12}} = c^{12}$$

$$(q^6)^3 = \overset{6 \cdot 3}{q^{18}} = q^{18}$$

Power of a Product	When raising a product to a power, raise each of the terms to that power.	Example: $(xy)^2 = x^2y^2$
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Using the Power of a Product rule (distributing the exponent), simplify the expressions below.

$$(ab)^2 = a^2b^2$$

$$(2g)^4 = 2^4g^4 = 16g^4$$

$$(4b)^3 = 4^3b^3 = 64b^3$$

$$(7x)^3 = 7^3x^3 = 343x^3$$

$$(k^2r)^3 = k^{2 \cdot 3}r^3 = k^6r^3$$

$$(x^2y^3z)^6 = x^{2 \cdot 6}y^{3 \cdot 6}z^6 = x^{12}y^{18}z^6$$

$$(2x \cdot 3x)^3 = (6x^2)^3 = 6^3x^6 = 216x^6$$

$$(y^3 \cdot 2y)^5 = (2y^4)^5 = 2^5y^{4 \cdot 5} = 32y^{20}$$

Power of a Quotient	When raising a quotient to a power, raise both the NUMERATOR and DENOMINATOR to that power.	Example: $\left(\frac{x}{y}\right)^2 = \frac{x^2}{y^2}$
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Using the Power of a Quotient rule (distributing the exponent), simplify the expressions below.

$$\left(\frac{c}{d}\right)^4 = \frac{c^4}{d^4}$$

$$\left(\frac{w}{x}\right)^5 = \frac{w^5}{x^5}$$

$$\left(\frac{a^4}{a^2}\right)^7 = \frac{a^{4 \cdot 7}}{a^{2 \cdot 7}} = \frac{a^{28}}{a^{14}} = a^{28-14} = a^{14}$$

$$\left(\frac{3x}{x}\right)^4 = (3)^4 = 81$$

$$\left(\frac{2k}{j}\right)^6 = \left(\frac{2k}{j}\right)^6 = \frac{2^6 k^6}{j^6} = \frac{64k^6}{j^6}$$

$$\left(\frac{6r}{8s}\right)^3 = \left(\frac{3r}{4s}\right)^3 = \frac{3^3 r^3}{4^3 s^3} = \frac{27r^3}{64s^3}$$

$$\left(\frac{w^1}{w^2}\right)^6 = \left(\frac{1}{w^1}\right)^6 = \frac{1^6}{w^{1 \cdot 6}} = \frac{1}{w^6}$$

$$\left(\frac{m^1}{m^5}\right)^2 = \left(\frac{1}{m^{5-1}}\right)^2 = \frac{1^2}{m^{4 \cdot 2}} = \frac{1}{m^8}$$