2.5 Exponent Law II

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Exponent Law for a Power of a Power

- to raise a power to a power, multiply the exponents
- for example $(2^3)^5 = 2^{3\times5} = \boxed{2^{15}}$

Ex #1 Write as a single power

(a.) $(3^2)^4$

$= 3^{2\times4}$

$= \boxed{3^8}$

(b.) $[(-5)^3]^2$

$= (-5)^{3\times2}$

$= (-5)^6$

base: -5

(c.) $-(2^3)^4$

$= -(2^{3\times4})$

$= -2^{12}$

base 2

Exponent Law for a Power of a Product

- the power of a product is the product of powers
- for example $(2\times3)^4 = 2^4 \times 3^4$

Ex. #2

(a) $(2\times5)^2$

$= 2^2 \times 5^2$

$= 4 \times 25$

(b) $[(-3)\times4]^2$

$= (-3)^2 \times 4^2$

$= 9 \times 16$

$= 4 \times 25$ $= 4 \times 16$

$= \boxed{100}$ $= \boxed{144}$

or. or.

$= (2 \times 5)^2$ $= [(-3) \times 4]^2$

$= (10)^2$ $= (-12)^2$

$= \boxed{100}$ $= \boxed{144}$

Exponent Law for a Power of a Quotient

- the power of a quotient is the quotient of powers
- for example: $\left(\frac{2}{3}\right)^4 = \frac{2^4}{3^4}$

Ex. #3 Evaluate

(a.) $[30 \div (-5)]^2$

$= \left(\frac{30}{-5}\right)^2$

$= \frac{30^2}{-5^2} = \frac{900}{25} = \boxed{36}$

or.

$= (30 \div -5)^2$

$= (-6)^2 = \boxed{36}$

(b) $\left(\frac{20}{4}\right)^2$

$= \frac{20^2}{4^2}$

$= \frac{400}{16} = \boxed{25}$

or.

$= \left(\frac{20}{4}\right)^2 = 5^2 = \boxed{25}$

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