

2.4 Exponent Laws I

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Exponent Law for a Product of Powers

to multiply powers with the same base, add the exponents

$$3^2 \times 3^4 = 3^{(2+4)} = 3^6$$

Ex. #1

$$\begin{array}{lll} \text{(a)} \quad \underline{5^3} \times \underline{5^4} & \text{(b)} \quad \underline{(-6)^2} \times \underline{(-6)^3} & \text{(c)} \quad \underline{(7^2)} \underline{(7)} \\ = 5^{3+4} & = (-6)^{2+3} & = 7^{2+1} \\ = \boxed{5^7} & = \boxed{(-6)^5} & = \boxed{7^3} \end{array}$$

Exponent Law for a Quotient of Powers

to divide powers with the same base, subtract the exponents

Ex. #2

$$\begin{array}{ll} \text{(a)} \quad 4^5 \div 4^3 & \text{(b.)} \quad (-2)^7 \div (-2)^2 \\ = 4^{5-3} & = (-2)^{(7-2)} \\ = \boxed{4^2} & = \boxed{(-2)^5} \end{array}$$

Ex. #3

$$\text{(a)} \quad 7^2 \checkmark 7^3 \div 7^4 \quad \text{(b.)} \quad (-7)^5 \div (-7)^3 \checkmark (-7)$$

$$(a) \overline{2^2 \times 2^3 \div 2^4}$$

$$= 2^{2+3-4}$$
$$= 2^1 = \boxed{2}$$

$$(b) (-2)^5 - (-2)^3 \times (-2)$$

$$= (-2)^{5-3+1}$$
$$= (-2)^3 = \boxed{8}$$