Unit 2.4 (Math 9)

Laws of Exponent – Part 1

IMPORTANT:

THE LAWS WE ARE ABOUT TO STUDY ONLY Apply to Powers of SAME OR EQUAL BASE

#1 POWER PRODUCT

↳ MULTIPLICATION of Powers

Let's see:

$$7^4 \cdot 7^5$$

$7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$ ⇒ Total of 9 7's

so

$$7^4 \cdot 7^5 = 7^9$$

this means that the exponents ADD when multiplying:

$$7^4 \cdot 7^5 = 7^{4+5} = 7^9$$

then: to Multiply Powers with same base

↓

ADD THE EXPONENTS

Law #1

#2 QUOTIENT OF POWERS ⇒ (DIVISION)

Let's see

$$9^5 \div 9^3 = \frac{\cancel{9}\cdot\cancel{9}\cdot\cancel{9}\cdot 9\cdot 9}{\cancel{9}\cdot\cancel{9}\cdot\cancel{9}}$$

you can eliminate!

2 left

$$= 9^2$$

this means that the exponents when dividing

SUBTRACT

$$\frac{9^5}{9^3} = 9^{5-3} = 9^2$$

Then: TO ~~MULTIPLY~~ POWERS WITH SAME BASE

↓

SUBTRACT THE EXPONENTS

Law II

COMBINATION Example:

$$3^2 \times 3^4 \div 3^3$$

- According to bedmas, you divide first

$$\frac{3^4}{3^3} = 3^{4-3} = 3^1$$

Standard form

Then

$$3^2 \times 3^1 = 3\cdot 3\cdot 3 = 3^3 = 27$$

Remember: Laws do not apply when adding or subtracting

$$6^2 + \underbrace{6^3 \times 6^2}_{\text{apply the laws}}$$

$$6^3 \times 6^2 = 6^{3+2} = 6^5$$

then $6^2 + 6^5$

$$\downarrow \qquad \downarrow$$

$$36 + 7776 = 7812$$

Notice that $6^2 + 6^5$ is not 6^7

$$\downarrow \qquad \downarrow$$

$$7812 \qquad 279,936$$

Then: these laws ONLY apply to multiplication and division

AND NOT

SUBTRACTION ADDITION