

October 7, 2015

5.5 Laws of Exponents

① $x^2 \cdot x^3 = x^{2+3} = x^5$
must be the same

② $\frac{x^3}{x^2} = \frac{\cancel{x} \cdot \cancel{x} \cdot x}{\cancel{x} \cdot \cancel{x}} = x^1$
some
 $x^{3-2} = x^1 = x$

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$$\frac{x^2}{x^3} = \frac{\boxed{x} \cdot \boxed{x} \cdot ?}{\boxed{x} \cdot \boxed{x} \cdot x} = \frac{1}{x}$$

$$x^{2-3} = -1 = \boxed{x^{-1}} \quad * \text{Never leave a negative exponent!}$$

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Negative Exponent Rule

① $\frac{a^{-m}}{1} = \frac{1}{a^{+m}}$
 $5^{-3} = \frac{1}{5^3} = \frac{1}{125}$

② $\frac{1}{a^{-m}} = \frac{a^{+m}}{1} = a^m$
 $\frac{1}{5^{-3}} = \frac{5^3}{1} = 125$

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#12) $(2x^2)^{-4} = \frac{1}{(2x^2)^4}$
base
 $= \frac{1}{2^4 \cdot (x^2)^4}$
 $= \frac{1}{16x^8}$

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$$(2x^2)^{-4} = 2^{-4} \cdot (x^2)^{-4}$$

$$= \frac{1}{2^4} \cdot \frac{1}{(x^2)^4}$$

$$= \frac{1}{16} \cdot \frac{1}{x^8} = \frac{1}{16x^8}$$

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$$\frac{x^{4-2}}{x^2} = x^2$$

$$\frac{b^4}{b^{12-8}} = \frac{1}{b^8}$$

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$$\frac{x^4}{x^{-8}} = x^4 \cdot x^8 = x^{12}$$

$$x^{4 - (-8)} = 4 + 8 = 12 = x^{12}$$

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$$\frac{x^{-4}}{x^5} = \frac{1}{x^5 \cdot x^4} = \frac{1}{x^9}$$

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$$\frac{x^3}{x^3} = \frac{\boxed{x} \cdot \boxed{x} \cdot \boxed{x}}{\boxed{x} \cdot \boxed{x} \cdot \boxed{x}} = \boxed{1}$$

$$x^{3-3=0} = \boxed{x^0}$$

(Anything)⁰ = 1

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$$\begin{aligned} (x^3)^2 &= (x^3) \cdot (x^3) \\ &= x \cdot x \cdot x \cdot x \cdot x \cdot x \\ &= x^6 \end{aligned}$$

$$\begin{aligned} (2^4 y^3)^4 &= 2y^3 \cdot 2y^3 \cdot 2y^3 \cdot 2y^3 \\ &= 16 y^{12} \end{aligned}$$

2⁴ = 16
↑ Base

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5.5 41 - 457 all

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