

March 24, 2017

Rules

① Product  
 $x^4 \cdot x^{10} = x^{4+10} = x^{14}$   
 $= x^{14}$

② Power  
 $(x^3)^3 = x^9$

③ Quotient  
 $\frac{x^5}{x^3} = x^{5-3} = x^2$

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④ Negative Exponent Rule

a.  $\frac{a^{-m}}{1} = \frac{1}{a^{+m}}$

think this:  $\frac{x^{-3}}{1} = \frac{1}{x^{+3}}$

b.  $\frac{1}{a^{-m}} = \frac{a^{+m}}{1} = a^m$

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same rule  $\left\{ \frac{x^6}{x^{10}} = x^{6-10} = x^{-4} = \frac{1}{x^4} \right.$

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meaning of Exponents

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

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

Quotient Rule

\* So, anything to the zero power is "one"!

Zero Exponent Rule  $\text{☺}^0 = 1$

$102694^0 + 1 = 1 + 1 = 2$

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

① Use Quotient:  $x^{2-(-4)} = x^{2+4} = x^6$

② Use Negative Exp. Rule:  $x^2 \cdot x^4$   
 use Product Rule  
 $= x^{2+4} = x^6$

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$\frac{x^6 y^4 t^{-3}}{x^2 y^{-5}}$

$x^4 y^9 \cdot \frac{1}{t^3} = \frac{x^4 y^9}{t^3}$

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$$\begin{aligned}
 & \underbrace{(2x^{-3}y^4)^2}_{\text{base}} \\
 &= (2x^{-3}y^4) \cdot (2x^{-3}y^4) \\
 &= 2 \cdot x^{-3} \cdot y^4 \cdot 2 \cdot x^{-3} \cdot y^4 \\
 &= 2 \cdot 2 \cdot x^{-3} \cdot x^{-3} \cdot y^4 \cdot y^4 \\
 &= 4 \cdot x^{-6} \cdot y^8 \\
 &= \frac{4}{1} \cdot \frac{1}{x^6} \cdot \frac{y^8}{1} \\
 &= \boxed{\frac{4y^8}{x^6}}
 \end{aligned}$$

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$$\begin{aligned}
 \underbrace{(2x^{-3}y^4)^2}_{\text{all being multiplied}} &= 2^2 \cdot (x^{-3})^2 \cdot (y^4)^2 \\
 &= 4x^{-6}y^8 \\
 &= \boxed{\frac{4y^8}{x^6}}
 \end{aligned}$$

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$$\begin{aligned}
 (3x^2y^{-3})^{-3} &= (3)^{-3} \cdot (x^2)^{-3} \cdot (y^{-3})^{-3} \\
 &= 3^{-3} \cdot x^{-6} \cdot y^9 \\
 &= \frac{y^9}{3^3 x^6} \\
 &= \boxed{\frac{y^9}{27x^6}}
 \end{aligned}$$

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Doing 5.5 set

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