

# Properties of Exponents Cheat Sheet

Name \_\_\_\_\_

<p><b>Multiplication Property:</b></p> <div style="border: 1px solid black; height: 80px; width: 100%;"></div> <p><i>Add exponents if bases are the same</i></p>	<p><b>EX w/ numbers:</b></p> $3^3 \cdot 3^5 =$	<p><b>EX w/ variables:</b></p> $x^2 \cdot x^{10} =$	<p><b>EX w/ num. and variables:</b></p> $2x^2 y \cdot 4x^3 y^5 =$
<p><b>Power Property:</b></p> <div style="border: 1px solid black; height: 80px; width: 100%;"></div> <p><i>Multiply exponents when they are inside and outside parenthesis</i></p>	<p><b>EX w/ numbers:</b></p> $(5^3)^4 =$	<p><b>EX w/ variables:</b></p> $(y^3)^{11} =$	<p><b>EX w/ num. and variables:</b></p> $(6x^4 y^8 z)^4 =$
<p><b>Division Property:</b></p> <div style="border: 1px solid black; height: 80px; width: 100%;"></div> <p><i>Subtract top exponent minus bottom exponent</i></p>	<p><b>EX w/ numbers:</b></p> $\frac{3^{12}}{3^5} =$	<p><b>EX w/ variables:</b></p> $\frac{y^{17}}{y^6} =$	<p><b>EX w/ num. and variables:</b></p> $\frac{3x^{10}}{9x^4} =$ <p><i>Simplify all fractions!</i></p>
<p><b>Zero Property:</b></p> <div style="border: 1px solid black; height: 60px; width: 100%;"></div> <p><i>Any number raised to the zero power is equal to 1</i></p>	<p><b>EX w/ numbers:</b></p> $100^0 =$	<p><b>EX w/ variables:</b></p> $(xy)^0 =$	<p><b>EX w/ num. and variables:</b></p> $(3a^2b^4)^0 =$ $3(a^2b^4)^0 =$
<p><b>Negative Exponent Property:</b></p> <div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p><i>If the exponent is negative move the term to the opposite side and make the exponent positive</i></p>	<p><b>EX w/ numbers:</b></p> $3^{-4} =$	<p><b>EX w/ variables:</b></p> $x^{-6} =$	<p><b>EX w/ num. and variables:</b></p> $\frac{16x^{-10}}{2x^{-2}} =$ <p><i>Simplify all fractions!</i></p>

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<p><b>Multiplication Property:</b></p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <math display="block">b^n \cdot b^m = b^{(n+m)}</math> </div> <p><i>Add exponents if bases are the same</i></p>	<p><b>EX w/ numbers:</b></p> $3^3 \cdot 3^5 = 3^{3+5} = 3^8$	<p><b>EX w/ variables:</b></p> $x^2 \cdot x^{10} = x^{2+10} = x^{12}$	<p><b>EX w/ num. and variables:</b></p> $2x^2 y \cdot 4x^3 y^5 =$ $2 \cdot 4 \cdot x^{2+3} \cdot y^{1+5} = 8x^5 y^6$
<p><b>Power Property:</b></p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <math display="block">(b^n)^m = b^{n \cdot m}</math> </div> <p><i>Multiply exponents when they are inside and outside parenthesis</i></p>	<p><b>EX w/ numbers:</b></p> $(5^3)^4 = 5^{3 \cdot 4} = 5^{12}$	<p><b>EX w/ variables:</b></p> $(y^3)^{11} = y^{3 \cdot 11} = y^{33}$	<p><b>EX w/ num. and variables:</b></p> $(6x^4 y^8 z)^4 =$ $6^4 x^{4 \cdot 4} y^{8 \cdot 4} z^4 =$ $1296x^{16} y^{32} z^4$ <p><i>Distribute the exponent to ALL terms!</i></p>
<p><b>Division Property:</b></p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <math display="block">\frac{b^n}{b^m} = b^{(n-m)}</math> </div> <p><i>Subtract top exponent minus bottom exponent</i></p>	<p><b>EX w/ numbers:</b></p> $\frac{3^{12}}{3^5} = 3^{12-5} = 3^7$	<p><b>EX w/ variables:</b></p> $\frac{y^{17}}{y^6} = y^{17-6} = y^{11}$	<p><b>EX w/ num. and variables:</b></p> $\frac{3x^{10}}{9x^4} = \frac{1}{3} x^{10-4} = \frac{1}{3} x^6$ <p><i>Simplify all fractions!</i></p>
<p><b>Zero Property:</b></p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <math display="block">b^0 = 1</math> </div> <p><i>Any number raised to the zero power is equal to 1</i></p>	<p><b>EX w/ numbers:</b></p> $100^0 = 1$	<p><b>EX w/ variables:</b></p> $(xy)^0 = 1$	<p><b>EX w/ num. and variables:</b></p> $(3a^2 b^4)^0 = 1$ $3(a^2 b^4)^0 = 3 \cdot 1 = 3$
<p><b>Negative Exponent Property:</b></p> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <math display="block">b^{-n} = \frac{1}{b^n} \quad \text{and} \quad \frac{1}{b^n} = b^{-n}</math> </div> <p><i>If the exponent is negative move the term to the opposite side and make the exponent positive</i></p>	<p><b>EX w/ numbers:</b></p> $3^{-4} = \frac{1}{3^4}$	<p><b>EX w/ variables:</b></p> $x^{-6} = \frac{1}{x^6}$	<p><b>EX w/ num. and variables:</b></p> $\frac{16x^{-10}}{2x^2} = \frac{8x^2}{x^{10}} = \frac{8}{x^8}$ <p><i>Simplify all fractions!</i></p>