

Pre-Calculus Worksheet
NEEDED SKILLS for Exponents

Name: _____
 Period: _____

NOTE: For the RULES, let a and b be real numbers and m and n positive integers.

DAY ONE: Simplify. Write your final answer with positive exponents ONLY.

Rule: $a^{-m} = \frac{1}{a^m}$ AND $\frac{1}{a^{-m}} = a^m$	1. $\frac{1}{a^{-3}}$ a^3	2. m^{-12} $\frac{1}{m^{12}}$	3. $2y^{-5}$ $\frac{2}{y^5}$	4. $\frac{5}{4r^{-3}}$ $\frac{5r^3}{4}$	5. $-12a^4b^{-7}$ $\frac{-12a^4}{b^7}$
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DAY TWO: Simplify. Write your final answer with positive exponents ONLY.

Rule: $a^m \cdot a^n = a^{m+n}$	1. $z^2 \cdot z^3$ z^5	2. $2a^9 \cdot 5a^{-2}$ $10a^7$	3. $(-4r^{-3})(5t^{-5})$ $\frac{-20}{t^5}$	4. $-2x^{-1}y^{-4} \cdot 3x^2y$ $\frac{-6x}{y^3}$	5. $z^{n+2} \cdot z^{n-2}$ z^{2n}
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DAY THREE: Simplify. Write your final answer with positive exponents ONLY.

Rule: $(ab)^m = a^m b^m$	1. $(xy)^{-3}$ $\frac{1}{x^3 y^3}$	2. $(4ac)^3$ $64a^3 c^3$	3. $(-6x)^2 \cdot (2xy)^{-2}$ $\frac{36x^2}{4x^2 y^2} = \frac{9}{y^2}$	4. $(rt)^{-2} \cdot r^3 t^{-5}$ $\frac{1}{r^2 t^2} \cdot \frac{r^3}{t^5} = \frac{r}{t^7}$	5. $(5ac)^4 \cdot (3c)^2$ $5^4 a^4 c^4 \cdot 9c^2 = 5625a^4 c^6$
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DAY FOUR: Simplify. Write your final answer with positive exponents ONLY.

Rule: $(a^m)^n = a^{mn}$	1. $(4s^3)^4$ $256s^{12}$	2. $(5x^2y^{-4})^{-2}$ $\frac{1}{25x^{-4}y^8} = \frac{x^4}{25y^8}$	3. $(-2c^{-3}d^4)^3$ $\frac{-8c^{-9}d^{12}}{1} = \frac{-8d^{12}}{c^9}$	4. $(-x^2y)^3 \cdot (x^{-5}y)$ $-x^6y^3 \cdot x^{-5}y = -x^{11}y^4$	5. $(9a^2)^{-2} \cdot (-3ab^2)^3$ $\frac{1}{81a^4} \cdot -27a^3b^6 = \frac{-27a^3b^6}{81a^4} = \frac{-b^6}{3a}$
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DAY FIVE: Simplify. Write your final answer with positive exponents ONLY.

<p>Rule: $\frac{a^m}{a^n} = a^{m-n}$</p>	<p>1. $\frac{x^{-3}}{x^7}$ $\frac{1}{x^{10}}$</p>	<p>2. $\frac{5a^{13}}{2a^4}$ $\frac{5}{2a^9}$</p>	<p>3. $\frac{-4a^2}{a^{-10}}$ $-4a^{12}$</p>	<p>4. $\frac{s^{-2}t^{-3}}{4s^{-1}t^5}$ $\frac{1}{4st^8}$</p>	<p>5. $\left(\frac{a^4}{b^{-6}}\right) \cdot 10a^{-7}b^2$ $\frac{10a^{-3}b^3}{a^2}$</p>
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DAY SIX: Simplify. Write your final answer with positive exponents ONLY.

<p>Rule: $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$</p>	<p>1. $\left(\frac{3x}{4}\right)^2$ $\frac{9x^2}{16}$</p>	<p>2. $\left(\frac{r^{-5}}{3s^2}\right)^4$ $\frac{r^{-20}}{81s^8}$ $\frac{1}{81r^{20}s^8}$</p>	<p>3. $\left(\frac{7r^{-2}}{st^{-3}}\right)^2 \cdot \frac{r^5}{s^{-6}}$ $\frac{49t^{-4}}{s^3t^{-6}} \cdot \frac{t^5}{s^{-4}}$ $\frac{49t^7s^3}{1}$</p>	<p>4. $\left(\frac{-v^{-2}}{4w}\right)^{-3} \left(\frac{w^2}{v^{-1}}\right)^2$ $\frac{v^6}{4^3w^{-3}} \cdot \frac{w^4}{v^{-2}}$ $v^8 \cdot w^7 \cdot 64$</p>	<p>5. $\left(\frac{12x^4}{3x^{-2}}\right)^3$ $(4x^6)^3$ $64x^{18}$</p>
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DAY SEVEN: Simplify. Write your final answer with positive exponents ONLY.

<p>Rule: $a^0 = 1$</p>	<p>1. $-6x^0$ -6</p>	<p>2. $2a^3b^{-6} \cdot 5a^0b^2$ $2a^3b^{-4} \cdot 5b^2$ $\frac{10a^3}{b^4}$</p>	<p>3. $\left(\frac{100x^3y}{13z^{-5}}\right)^0$ 1</p>	<p>4. $(2m^4n)^2(-5^0mn^{-1})$ $-4m^8n^2 \cdot m^{-1}$ $-4m^7n$</p>	<p>5. $\frac{10a^{-13}}{-20a^{10}a^0}$ $\frac{-1}{2a^{23}}$</p>
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DAY EIGHT: Simplify. Write your final answer with positive exponents ONLY.

<p>1. $(7x^2yz^{-4})(3x^{-3}y)$ $\frac{21y^2}{x^2z^4}$</p>	<p>2. $(5t)^{-2}(-2t^3)^3$ $\frac{1}{25t^2} \cdot -8t^9$ $\frac{-8}{25}t^7$</p>	<p>3. $(-4x^{-5}z^2)^{-2}(8x^{-8})$ $\frac{16x^{10}}{16z^4} \cdot 8x^{-8}$ $\frac{x^2}{z^4}$</p>	<p>4. $\left(\frac{12m^{-5}n}{-56m^0n^2}\right)^0$ 1</p>
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DAY NINE: Simplify. Write your final answer with positive exponents ONLY.

<p>1. $3t^n \cdot t^{-2} \cdot 8t^n$ $24t^{2n-2}$</p>	<p>2. $(6c^2)(-3c^{-4})^2$ $6c^2 \cdot 9c^{-8}$ $\frac{54}{c^6}$</p>	<p>3. $-8b^3(-3b^2 + b - 6)$ $24b^5 + -9b^4 + 48b^3$</p>	<p>4. $2rs^2(-r^3s^2)^3 + (3r^5s^4)^2$ $+2r^2s^2(-r^9s^6) + 9r^{10}s^8$ $-2r^{10}s^8 + 9r^{10}s^8$</p>
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