Exponent Rules:

If it is a power problem, you should multiply the exponents

If it is a multiplication or division problem, you should add or subtract the exponents –when subtracting, always leave the answer as a positive exponent wherever there are more of that variable

If it is an addition or subtraction problem, the exponents do not change at all

\*Think of it this way: Exponents are smaller than regular numbers. If it is a regular number, it follows the math in the problem. If it is an exponent, it does one thing easier.\*

Ex. $\left(2x^{4}\right)^{3}=8x^{12}$ $\left(7x^{4}y^{5}\right)\left(-2xy^{3}\right)=-14x^{5}y^{8}$ $5x^{3}-9x+2x^{3}=7x^{3}-9x$

$\frac{18x^{6}y}{30x^{3}y^{4}}=\frac{3x^{3}}{5y^{3}}$ $7x^{3}\left(4x^{2}-2x+1\right)=28x^{5}-14x^{4}+7x^{3}$

$$\left(-3x^{4}y^{5}\right)^{2}\left(5x^{3}y^{4}\right)=\left(9x^{8}y^{10}\right)\left(5x^{3}y^{4}\right)=45x^{11}y^{14} $$

You try:

$14x-3x^{3}+2x^{2}-5x+x^{3}$ $\left(-3xy^{4}\right)\left(-8xy^{5}\right)\left(2x^{3}\right)$ $\left(-5x^{7}y\right)^{2}$

$\frac{-24x^{5}}{6x^{8}}$ $-4x^{2}\left(5x^{3}+4x-3\right)$ $\frac{45x^{5}y^{3}z^{2}}{50xy^{3}z^{9}}$

$\left(7x^{3}y^{9}\right)\left(3x^{15}y^{8}\right)^{2} $ $\frac{\left(4x^{5}\right)^{3}}{8x^{20}}$

Negative exponents: You never want a negative exponent. To make an exponent positive, move it to the other side of the fraction (ex. if there is a negative exponent in the denominator, move it to the numerator)

Ex. $\frac{x^{-5}}{x^{2}}=\frac{1}{x^{5}x^{2}}=\frac{1}{x^{7}}$ $\frac{12x^{-5}y^{3}}{-4x^{-3}y^{-4}}=\frac{-3x^{3}y^{3}y^{4}}{x^{5}}=\frac{-3y^{7}}{x^{2}}$ $\left(3x^{2}\right)^{-3}=$ $\frac{1}{\left(3x^{2}\right)^{3}}=\frac{1}{27x^{6}}$

You try: $\left(4x^{3}\right)^{-2 }$ $\frac{-6x^{-8}}{8x^{-15}}$ $\frac{5xy^{-3}}{15x^{-4}y^{-1}}$

Scientific Notation: Defined a number between 1 and 10, multiplied by a power of 10 $\left(Ex. 5.6\*10^{7}\right)$

Rules: Count the # of decimal places you have to move in order to get a number between 1 and 10, and that will be the exponent on 10. If the original number is smaller than 1, the exponent will be negative; otherwise the exponent will be positive.

Ex. $ 4370 \rightarrow 4.37\*10^{3}$ $0.00437 \rightarrow 4.37\*10^{-3}$

$2.573\*10^{-1} \rightarrow 0.2573$ $2.573\*10^{1} \rightarrow 25.73$

You try:

Write as a standard number: Write in scientific notation:

$1.8\*10^{5}$ $5.24\*10^{-2}$ $714.38$ $0.0006$