Here is a walk-through example of how to do a problem like this:

Example 1. *Use rules of exponents to rewrite the following expression without any fractions (using negative exponents if needed):*

$$\left(\frac{\frac{a^3b^2c^{-4}d^6}{a^2d^{-2}}}{\frac{a^4c^{-2}}{c^3d}}\right)^5\left(\frac{\frac{b^2cd^3}{a^2}}{\frac{b^3c}{a^{-2}d^3}}\right)^{-3}$$

Solution: First, we should try to simplify the parts inside the large parentheses. Keep in mind this means we will need to do a bunch of algebra and our last line is likely to involve a ton of cancellation, so remember to use all the rules to combine exponentials with the same base to see how the below happens (especially the last step!)

$$\begin{aligned}
\left(\frac{\frac{a^3b^2c^{-4}d^6}{a^2d^{-2}}}{\frac{a^4c^{-2}}{c^3d}}\right)^5\left(\frac{\frac{b^2cd^3}{a^2}}{\frac{b^3c}{a^{-2}d^3}}\right)^{-3} &= \left(\frac{a^3b^2c^{-4}d^6}{a^2d^{-2}}\cdot\frac{c^3d}{a^4c^{-2}}\right)^5\left(\frac{b^2cd^3}{a^2}\cdot\frac{a^{-2}d^3}{b^3c}\right)^{-3} && \text{Step 1: Invert the bottom fractions and multiply}\\
&= \left(\frac{a^3b^2c^{-4}d^6c^3d}{a^2d^{-2}a^4c^{-2}}\right)^5\left(\frac{b^2cd^3a^{-2}d^3}{a^2b^3c}\right)^{-3} && \text{Step 2: Multiply straight across}\\
&= \left(\frac{b^2cd^9}{a^3}\right)^5\left(\frac{d^6}{a^4b}\right)^{-3} && \text{Step 3: Combine like terms to simplify.}
\end{aligned}$$

Next we want to distribute the large power to each of the terms inside the parentheses. We can do this ***only because*** *everything inside is being multiplied! In essence, the inside is factored, so we can distribute the outer power.*

$$\begin{aligned}
\left(\frac{\frac{a^3b^2c^{-4}d^6}{a^2d^{-2}}}{\frac{a^4c^{-2}}{c^3d}}\right)^5\left(\frac{\frac{b^2cd^3}{a^2}}{\frac{b^3c}{a^{-2}d^3}}\right)^{-3} &= \left(\frac{b^2cd^9}{a^3}\right)^5\left(\frac{d^6}{a^4b}\right)^{-3} && \text{From previous work.}\\
&= \left(\frac{b^{10}c^5d^{45}}{a^{15}}\right)\left(\frac{d^{-18}}{a^{-12}b^{-3}}\right) && \text{Distribute Power.}\ [1]\\
&= \frac{b^{10}c^5d^{45}d^{-18}}{a^{15}a^{-12}b^{-3}} && \text{Multiple Straight Across.}\\
&= \frac{b^{13}c^5d^{27}}{a^3} && \text{Simplify powers using Exponential Properties.}\\
&= a^{-3}b^{13}c^5d^{27} && \text{Rewrite using negative exponents to avoid having a fraction.}
\end{aligned}$$

Problem 1 *Use rules of exponents to rewrite the following expression without any fractions (using negative exponents if needed).*

$$\left(\frac{\frac{y}{r^5x^4z^6}}{\frac{x^4y^4z^2}{r^5}}\right)^3\cdot\left(\frac{\frac{r^6}{x^2y^5z}}{\frac{y^3}{r^4x^6z^4}}\right)^1 = x^{\boxed{-20}}\cdot y^{\boxed{-17}}\cdot z^{\boxed{-21}}\cdot r^{\boxed{10}}$$

Feedback(attempt): *Follow the walkthrough above closely; start with simplifying the inside of each set of parentheses, then distribute the power from the parentheses, then combine the two results into a single fraction.*

Problem 2 *Use rules of exponents to rewrite the following expression without any fractions (using negative exponents if needed).*

$$\left(\frac{\frac{ry^5z}{x^2}}{\frac{y^5}{r^2x^5z^4}}\right)^{-1}\cdot\left(\frac{\frac{y^4}{r^4x^3z^6}}{\frac{r^5y^3}{x^3z^5}}\right)^{-5} = x^{\boxed{-3}}\cdot y^{\boxed{-5}}\cdot z^{\boxed{0}}\cdot r^{\boxed{42}}$$

Feedback(attempt): *Follow the walkthrough above closely; start with simplifying the inside of each set of parentheses, then distribute the power from the parentheses, then combine the two results into a single fraction.*

Problem 3 *Use rules of exponents to rewrite the following expression without any fractions (using negative exponents if needed).*

$$\left(\frac{\frac{r^2x^2}{z^5}}{\frac{x^4y}{r^5z}}\right)^{-1} \cdot \left(\frac{\frac{r^5x^6z}{y^6}}{\frac{r^4y}{x^5z}}\right)^{-6} = x^{\boxed{-64}} \cdot y^{\boxed{43}} \cdot z^{\boxed{-8}} \cdot r^{\boxed{-13}}$$

Feedback(attempt): *Follow the walkthrough above closely; start with simplifying the inside of each set of parentheses, then distribute the power from the parentheses, then combine the two results into a single fraction.*

Problem 4 *Use rules of exponents to rewrite the following expression without any fractions (using negative exponents if needed).*

$$\left(\frac{\frac{r^4x^4y^5}{z^6}}{r^6x^3y^6z}\right)^{3} \cdot \left(\frac{r^4x^6yz^5}{\frac{y^4z^4}{r^4x^6}}\right)^{4} = x^{\boxed{51}} \cdot y^{\boxed{-15}} \cdot z^{\boxed{-17}} \cdot r^{\boxed{26}}$$

Feedback(attempt): *Follow the walkthrough above closely; start with simplifying the inside of each set of parentheses, then distribute the power from the parentheses, then combine the two results into a single fraction.*