6.1 Properties of Exponents - Worksheet 1

1 Calculate $t^2 \cdot t^4$ using a presentation that shows all of the individual steps. Then verify that the product rule gives the same result.

Why write it out when there's a formula? It's important to really understand the formula and not just use it. Otherwise, you might apply the wrong formula at the wrong time and not understand why things are off.

2 Calculate $\left(a^3\right)^4$ using a presentation that shows all of the individual steps. Then verify that the power rule gives the same result.

3 Calculate $y^{-3} \cdot y^5$ using a presentation that shows all of the individual steps. Then verify that the product rule gives the same result.

6.2 Properties of Exponents - Worksheet 2

1 Calculate $x^{-2} \cdot x^{-3}$ using a presentation that shows all of the individual steps. Then verify that the product rule gives the same result.

2 Calculate $\left(x^{-1}\right)^{-n}$ using the power rule. Then rewrite the part of the expression inside the parentheses using the definition of negative exponents. In order for the math to be consistent, the two results should be equal. Explain how this verifies the first formula in Theorem 6.4.

Mathematicians like their formulas to be as consistent as possible.

3 Start from the equation $x^{-n} = \frac{1}{x^n}$ and take the reciprocal of both sides of the equation. Explain how this verifies the second formula in Theorem 6.4.

Recall that the reciprocal of the fraction $\frac{a}{b}$ is $\frac{b}{a}$.

6.3 Properties of Exponents - Worksheet 3

1 Calculate $x^2 \cdot x^{-5}$ using a presentation that shows all of the individual steps. Then verify that the product rule gives the same result. Give your final answer in the form x^n for some number n.

2 Calculate $x^{2n} \cdot x^{3n}$ using the product rule. Explain the logic of your result in complete sentences.

Remember that variables are just numbers in disguise. What would you do for this problem if the exponents were just numbers?

3 Consider the following presentation:

$$
\begin{aligned}
x^3 \cdot x^{-3} &= x^3 \cdot \frac{1}{x^3} && \text{Definition of negative exponents} \\
&= \frac{x^3}{x^3} && \text{Multiply fractions} \\
&= \frac{x \cdot x \cdot x}{x \cdot x \cdot x} && \text{Definition of exponents} \\
&= \frac{\cancel{x \cdot x \cdot x}}{\cancel{x \cdot x \cdot x}} && \text{Reduce the fraction} \\
&= 0
\end{aligned}
$$

Identify and explain the error. What would you suggest as a way for students to avoid this mistake?

6.4 Properties of Exponents - Worksheet 4

1 Calculate $\left(x^3\right)^{-4}$ using a presentation that shows all of the individual steps. Then verify that the power rule gives the same result. Give your final answer in the form x^n for some number n.

2 Calculate $\left(x^{2m}\right)^{3n}$ using the power rule. Explain the logic of your result in complete sentences.

3 Calculate $x^4 \cdot x^{-4}$ using a presentation that shows all of the individual steps. Then verify that the product rule gives the same result.

Write your answer using the simplest notation possible.

6.5 Properties of Exponents - Worksheet 5

1 Calculate $\left(x^{-3}\right)^{-4}$ using a presentation that shows all of the individual steps. Then verify that the power rule gives the same result. Give your final answer in the form x^n for some number n.

You may want to review Theorem 6.4 for showing all of the steps.

2 Calculate $x^n \cdot x^m \cdot x^p$. Explain the logic of your result.

Mathematicians look for ways to generalize our results so that the ideas we have can be applied to more situations.

3 Calculate $((x^n)^m)^p$. Explain the logic of your result.