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# Division Properties of Exponents Guide Notes

## Division Properties of Exponent

Dividing Same Base

$$\frac{a^m}{a^n} = \begin{cases} a^{m-n}, \text{If } m > n \\ 1 \quad , \text{If } m = n \\ \dfrac{1}{a^{n-m}}, \text{If } m < n \end{cases}$$

Power of a Quotient

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

**Sample Problem 1:** Simplify the following expressions.

1. $\dfrac{x^7}{x^4}$

2. $\dfrac{y^4}{y^7}$

3. $\dfrac{-a^2}{a^2}$

4. $\dfrac{(3x)^3}{6x^3}$

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**Sample Problem 2:** Evaluate the following using properties of powers.

5. $\dfrac{2xy^3z}{4x^2yw}$

6. $\dfrac{-4^2z^2}{(-4)^2z^3}$

7. $\left(\dfrac{x^5}{2x^3}\right)^2$

8. $\left(\dfrac{4a^2b}{12ab^2}\right)^2$

9. $\dfrac{-2^2}{3x^2}\left(\dfrac{3x}{2}\right)^2$

10. $\dfrac{(-2ab)(3a^2b)}{12a^6b}$

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