

Handout for Video - Exponential Rules and Definitions

$$a^n \cdot a^m = a^{n+m}$$

$$\frac{a^n}{a^m} = a^{n-m} \quad a \neq 0$$

$$(ab)^n = a^n b^n$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} \quad b \neq 0$$

$$(a^n)^m = a^{nm}$$

$$a^0 = 1 \quad a \neq 0$$

$$a^{-1} = \frac{1}{a} \quad a \neq 0$$

Example 1. Simplify: $(4a^2b)^{-2}(a^{-3}b^2)^{-3}$

Example 2. Simplify: $\left(\frac{2ab^{-1}}{ab}\right)\left(\frac{3a^{-2}b}{a^2b^2}\right)^{-2}$

Simplify monomial expressions with integral exponents

1. Simplify: $\frac{-24a^3b^9}{16a^6b^3}$

2. Simplify: $(-2a^4b^{-2})(-4a^{-4}b^5)$

3. Simplify: $(2x^{-3}y^3)^2$

4. Simplify: $\frac{-28x^6y^{-3}}{42x^{-1}y^4}$

5. Simplify: $\frac{(9a^{-6}b^4)^{-1}}{(6ab^{-2})^{-2}}$

6. Simplify: $(x^{3n})(x^{2n+3})$

7. Simplify: $\frac{x^{2n+3}}{x^{n+4}}$

8. Simplify: $(x^{2n-1})^3$

9. Simplify: $(2a^{-3}b^4)^{-2}(a^2b^{-2})^3(-3a^{-4}b^5)$

10. Simplify: $\left(\frac{2ab^{-1}}{ab}\right)^{-1}\left(\frac{3a^{-2}b}{a^2b^2}\right)^{-2}$

Solutions

1. $\frac{-3b^6}{2a^3}$

2. $8b^3$

3. $\frac{4y^6}{x^6}$

4. $\frac{-2x^7}{3y^7}$

5. $\frac{4a^8}{b^8}$

6. x^{5n+3}

7. x^{n-1}

8. x^{6n-3}

9. $\frac{-3a^8}{b^9}$

10. $\frac{a^8b^4}{18}$