

2.4 Dividing Powers With The Same Base

Remember: When we multiply powers with the same base we can combine them into a single base and add the exponents.

Hypothesis – When we divide powers with the same base we can combine them into a single base and _____ the exponents. Let’s test this out....

Class Notes – Expand the expression and simplify, then condense it.

LP#1 $\frac{8^7}{8^3}$	$\frac{12^6}{12^4}$
LP#2 $\frac{x^5}{x^2}$	$\frac{y^{10}}{y^5}$
LP#3 $\frac{4^3 \cdot m^6}{4 \cdot m^4}$	$\frac{7^5 \cdot p^4}{7^3 \cdot p}$

Use what you observe above to complete the following.

Combine the like powers below into one power.

$\frac{x^a}{x^b} =$	$\frac{x^a \cdot y^c}{x^b \cdot y^d} =$
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The resulting exponents for the expression above are _____.

Class Notes – Simplify the following expressions.

LP#4 $\frac{13^{11}}{13^7}$	$\frac{20^{19}}{20^{10}}$	$\frac{190^{32}}{190^{14}}$	$\frac{d^{15}}{d^8}$
LP#5 $\frac{g^3 h^{24}}{gh^{16}}$	$\frac{j^4 k^{55}}{j^2 k^{22}}$	$\frac{6^7 \cdot x^{16}}{6^2 \cdot x^{11}}$	$\frac{14^{10} \cdot y^{16}}{14^4 \cdot y^4}$

Review – Simplify the following expressions.

R#1 $\frac{10^8}{10^4}$	$\frac{m^5}{m^2}$	$\frac{k^{14}}{k^{10}}$	$\frac{a^7 \cdot b^{16}}{a^2 \cdot b^{11}}$
R#2 $\frac{5^{12}}{5^6}$	$\frac{g^9}{g^3}$	$\frac{3^6 \cdot x^{11}}{3^2 \cdot x^7}$	$\frac{d^3 e^{10}}{d^2 e^6}$
R#3 $\frac{h^{11}}{h^3}$	$\frac{x^7 \cdot y^{16}}{x^4 \cdot y^{13}}$	$\frac{m^9 \cdot n^{12}}{m^2 \cdot n^{11}}$	$\frac{p^2 q^{16}}{p^2 q^{13}}$

Homework – Simplify the following expressions.

- 1) $\frac{8^6}{8^2}$ 2) $\frac{3^6}{3}$ 3) $\frac{12^7}{12^7}$ 4) $\frac{7^{10}}{7^6}$ 5) $\frac{4^{15}}{4^9}$
- 6) $\frac{x^{11}}{x^7}$ 7) $\frac{y^9}{y^3}$ 8) $\frac{a^{18}}{a^{11}}$ 9) $\frac{b^{28}}{b^{16}}$ 10) $\frac{c^{32}}{c^{21}}$
- 11) $\frac{2^5 \cdot y^{18}}{2^2 \cdot y^{10}}$ 12) $\frac{9^7 \cdot x^7}{9^6 \cdot x^7}$ 13) $\frac{4^2 \cdot p^{18}}{4 \cdot p^{12}}$ 14) $\frac{11^8 \cdot d^{21}}{11^4 \cdot d^{15}}$ 15) $\frac{12^5 \cdot x^{26}}{12^3 \cdot x^{19}}$
- 16) $\frac{g^{10} h^{12}}{g^6 h^7}$ 17) $\frac{k^5 m^{13}}{k^2 m^6}$ 18) $\frac{a^3 b^{10}}{a^3 b^9}$ 19) $\frac{x^3 y^{14}}{xy^6}$ 20) $\frac{m^{13} n^{10}}{m^2 n^8}$
- 21) $\frac{g^9 h^{12} i^8}{g^6 h^{10} i^4}$ 22) $\frac{a^8 b^2 c^{18}}{a^2 b c^{12}}$ 23) $\frac{w^9 x^{12} y^8}{w^2 x^4 y^7}$ 24) $\frac{f^9 g^{12} h^8}{f^9 g^{12} h^7}$ 25) $\frac{r^{19} s^{22} t^{18}}{r^{16} s^{10} t^{14}}$

Synthesis – Simplify the following expressions.

- 26) $\frac{8x^{12}}{2x^8}$ 27) $\frac{9y^9}{3y^4}$ 28) $\frac{20a^{17}}{5a^{10}}$ 29) $\frac{36b^{13}}{9b^{12}}$ 30) $\frac{24c^{22}}{7c^{11}}$
- 31) $\frac{18g^{11} h^{12}}{6g^3 h^5}$ 32) $\frac{32k^{15} m^{19}}{8k^{12} m^{16}}$ 33) $\frac{16a^5 b^{13}}{4a^2 b^9}$ 34) $\frac{7x^3 y^{10}}{7xy^6}$ 35) $\frac{24m^7 n^{10}}{2m^4 n^9}$