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<b>Exponential Rules</b>
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Use laws of exponents to rewrite each expression as single positive exponent:

1) $\left(\frac{2^{-5} \times 2^3}{2^{-7}}\right)^2$	2) $\left(\frac{5^{-8} \times 5^{-4}}{5^2 \times 5^3}\right)^{-3}$	3) $\left(\left(7^2 \times \frac{7^3}{7^4 \times 7^5}\right)^{-2}\right)^{-4}$
4) $\left(\left(\frac{7^{-9}}{7^{-3} \times 7^{-2}}\right)^{-2}\right)^{-3}$	5) $8^{-2} \times \left(\frac{8^3 \times 8^{-5}}{8^{-6}}\right)^3$	6) $\left(\frac{4^{-9} \times 4^{-8}}{4^{-5}}\right)^3 \times (4^{-4})^{-2}$
7) $\left(\left(\frac{17^{-9}}{17^{-7}}\right)^2 \times \left(\frac{17^5}{17^2}\right)^{-3}\right)^2$	8) $\left(\frac{(5^{-6} \times 5^3)^2}{5^{-7}}\right)^{-8}$	9) $\left(\left(\frac{13^{-2} \times 13^7}{13^9}\right)^{12} \times 13^{-8}\right)^{-3}$
10) $\left(\frac{5}{7}\right)^{-3} \times \left(\frac{\left(\frac{5}{7}\right)^{-5}}{\left(\frac{5}{7}\right)^6 \times \left(\frac{5}{7}\right)^4}\right)^2$	11) $\left(\frac{\left(\frac{5}{7}\right)^2 \times \left(\frac{5}{7}\right)^{-5}}{\left(\frac{5}{7}\right)^{-4}}\right)^3$	12) $\left(\frac{(15^{-2})^{-5} \times (15^{-3})^{-2}}{(15^{-3})^{-2} \times (15^{-4})^{-3}}\right)^7$
13) $\left(\frac{\left(\frac{11}{13}\right)^{-2} \times \left(\frac{11}{13}\right)^{-3}}{\left(\frac{11}{13}\right)^4 \times \left(\frac{11}{13}\right)^2}\right)^{-5}$	14) $\left(\frac{\left(\frac{-13}{15}\right)^3 \times \left(\frac{-13}{15}\right)^4}{\left(\left(\frac{-13}{15}\right)^{-5}\right)^{-3}}\right)^{-3}$	15) $\left(\frac{9}{13}\right)^{-3} \times \left(\frac{\left(\frac{9}{13}\right)^{-2}}{\left(\frac{9}{13}\right)^2 \times \left(\frac{9}{13}\right)^5}\right)^{-2}$

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**Answers**

1) $\left(\frac{2^{-5} \times 2^3}{2^{-7}}\right)^2$  $= 2^{10}$	2) $\left(\frac{5^{-8} \times 5^{-4}}{5^2 \times 5^3}\right)^{-3}$  $= 5^{51}$	3) $\left(\left(7^2 \times \frac{7^3}{7^4 \times 7^5}\right)^{-2}\right)^{-4}$  $= \frac{1}{7^{32}}$
4) $\left(\left(\frac{7^{-9}}{7^{-3} \times 7^{-2}}\right)^{-2}\right)^{-3}$  $= \frac{1}{7^{24}}$	5) $8^{-2} \times \left(\frac{8^3 \times 8^{-5}}{8^{-6}}\right)^3$  $= 8^{10}$	6) $\left(\frac{4^{-9} \times 4^{-8}}{4^{-5}}\right)^3 \times (4^{-4})^{-2}$  $= \frac{1}{4^{28}}$
7) $\left(\left(\frac{17^{-9}}{17^{-7}}\right)^2 \times \left(\frac{17^5}{17^2}\right)^{-3}\right)^2$  $= \frac{1}{17^{26}}$	8) $\left(\frac{(5^{-6} \times 5^3)^2}{5^{-7}}\right)^{-8}$  $= \frac{1}{5^8}$	9) $\left(\left(\frac{13^{-2} \times 13^7}{13^9}\right)^{12} \times 13^{-8}\right)^{-3}$  $= 13^{168}$
10) $\left(\frac{5}{7}\right)^{-3} \times \left(\frac{\left(\frac{5}{7}\right)^{-5}}{\left(\frac{5}{7}\right)^6 \times \left(\frac{5}{7}\right)^4}\right)^2$  $= \left(\frac{7}{5}\right)^{33}$	11) $\left(\frac{\left(\frac{5}{7}\right)^2 \times \left(\frac{5}{7}\right)^{-5}}{\left(\frac{5}{7}\right)^{-4}}\right)^3$  $= \left(\frac{5}{7}\right)^3$	12) $\left(\frac{(15^{-2})^{-5} \times (15^{-3})^{-2}}{(15^{-3})^{-2} \times (15^{-4})^{-3}}\right)^7$  $= \frac{1}{15^{14}}$
13) $\left(\frac{\left(\frac{11}{13}\right)^{-2} \times \left(\frac{11}{13}\right)^{-3}}{\left(\frac{11}{13}\right)^4 \times \left(\frac{11}{13}\right)^2}\right)^{-5}$  $= \left(\frac{11}{13}\right)^{55}$	14) $\left(\frac{\left(\frac{-13}{15}\right)^3 \times \left(\frac{-13}{15}\right)^4}{\left(\left(\frac{-13}{15}\right)^{-5}\right)^{-3}}\right)^{-3}$  $= \left(\frac{-13}{15}\right)^{24}$	15) $\left(\frac{9}{13}\right)^{-3} \times \left(\frac{\left(\frac{9}{13}\right)^{-2}}{\left(\frac{9}{13}\right)^2 \times \left(\frac{9}{13}\right)^5}\right)^{-2}$  $= \left(\frac{9}{13}\right)^{15}$

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