

Name: _____

Score: _____

Exponential Rules

Pre-algebra: D2

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) $\left(\left(\frac{7^{-9}}{7^{-3} \times 7^{-2}}\right)^{-2}\right)$	<div style="border: 2px solid #0070C0; padding: 10px; background-color: #FFF; margin: auto;"> <h1 style="color: #0070C0; margin: 0;">PREVIEW</h1> <p style="color: #0070C0; font-weight: bold; margin: 5px 0;">Access the largest collection of worksheets for just \$19.95 per year!</p> <div style="display: flex; justify-content: space-around; margin: 10px 0;"> <div style="background-color: #0070C0; color: white; padding: 10px; width: 40%; text-align: center; border-radius: 10px;"> <p>Members, please log in to download this worksheet.</p> <p style="background-color: white; color: #0070C0; padding: 2px 5px; border-radius: 5px; display: inline-block;">Log in</p> </div> <div style="background-color: #0070C0; color: white; padding: 10px; width: 40%; text-align: center; border-radius: 10px;"> <p>Not a member? Please sign up to gain complete access.</p> <p style="background-color: white; color: #0070C0; padding: 2px 5px; border-radius: 5px; display: inline-block;">Sign up</p> </div> </div> <p style="color: #0070C0; font-size: small; margin: 0;">www.mathworksheets4kids.com</p> </div>	
7) $\left(\left(\frac{17^{-9}}{17^{-7}}\right)^2 \times \left(\frac{17^5}{17^2}\right)\right)$	$\left(\frac{4^{-8}}{5}\right)^3 \times (4^{-4})^{-2}$ $\left(\frac{13^7}{13^9}\right)^{12} \times 13^{-8}\right)^{-3}$	
10) $\left(\frac{5}{7}\right)^{-3} \times \left(\frac{\left(\frac{5}{7}\right)^{-1}}{\left(\frac{5}{7}\right)^6 \times \left(\frac{5}{7}\right)^{-2}}\right)$	$\left(\frac{15^{-5} \times (15^{-3})^{-2}}{15^{-2} \times (15^{-4})^{-3}}\right)^7$	
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) $\left(\frac{\left(\frac{-13}{15}\right)^3 \times \left(\frac{-13}{15}\right)^4}{\left(\frac{-13}{15}\right)^{-5}\right)^{-3}$	15) $\left(\frac{9}{13}\right)^{-3} \times \left(\frac{\left(\frac{9}{13}\right)^{-2}}{\left(\frac{9}{13}\right)^2 \times \left(\frac{9}{13}\right)^5}\right)^{-2}$

Name: _____

Answer key

Score: _____

Exponential Rules

Pre-algebra: D2

$$1) \left(\frac{2^{-5} \times 2^3}{2^{-7}} \right)^2$$

$$= 2^{10}$$

$$2) \left(\frac{5^{-8} \times 5^{-4}}{5^2 \times 5^3} \right)^{-3}$$

$$= 5^{51}$$

$$3) \left(\left(7^2 \times \frac{7^3}{7^4 \times 7^5} \right)^{-2} \right)^{-4}$$

$$= \frac{1}{7^{32}}$$

$$4) \left(\left(\frac{7^{-9}}{7^{-3} \times 7^{-2}} \right)^{-2} \right)^{-3}$$

$$= \frac{1}{7^{24}}$$

$$5) 8^{-2} \times \left(\frac{8^3 \times 8^{-5}}{5} \right)^3$$

$$6) \left(\frac{4^{-9} \times 4^{-8}}{5} \right)^3 \times (4^{-4})^{-2}$$

$$7) \left(\left(\frac{17^{-9}}{17^{-7}} \right)^2 \times \left(\frac{17^5}{17^2} \right)^3 \right)^{-3}$$

$$= \frac{1}{17^{26}}$$

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$$10) \left(\frac{5}{7} \right)^{-3} \times \left(\frac{\left(\frac{5}{7} \right)^{-6}}{\left(\frac{5}{7} \right)^6} \right)^{-2}$$

$$= \left(\frac{7}{5} \right)^{33}$$

$$13) \left(\frac{\left(\frac{11}{13} \right)^{-2} \times \left(\frac{11}{13} \right)^{-3}}{\left(\frac{11}{13} \right)^4 \times \left(\frac{11}{13} \right)^2} \right)^{-5}$$

$$= \left(\frac{11}{13} \right)^{55}$$

$$14) \left(\frac{\left(\frac{-13}{15} \right)^3 \times \left(\frac{-13}{15} \right)^4}{\left(\left(\frac{-13}{15} \right)^{-5} \right)^{-3}} \right)^{-3}$$

$$= \left(\frac{-13}{15} \right)^{24}$$

$$15) \left(\frac{9}{13} \right)^{-3} \times \left(\frac{\left(\frac{9}{13} \right)^{-2}}{\left(\frac{9}{13} \right)^2 \times \left(\frac{9}{13} \right)^5} \right)^{-2}$$

$$= \left(\frac{9}{13} \right)^{15}$$