



Name: _____ Class: M 2/ _____ Number: _____

Worksheet 3 Exponents

Simplify the following.

$$\begin{aligned}
 1) \quad & \frac{27^{n+2} - 6 \cdot 3^{3n+3}}{3^n \cdot 9^{n+2}} \\
 &= \frac{\frac{27^{n+2}}{3^n} - \frac{6 \cdot 3^{3n+3}}{3^n \cdot 9^{n+2}}}{3^n \cdot 9^{n+2}} \\
 &= \frac{3^{3n+4} - 2 \cdot 3^{3n+3}}{3^{3n+4}} \\
 &= \frac{3^{3n+4} (3 - 1)}{3^{3n+4}} \\
 &= 2
 \end{aligned}$$

$$\begin{aligned}
 2) \quad & \frac{10(2^{n+1}) - 2^{n+3}}{5(2^{n+1}) - 24(2^{n-2})} \\
 &= \frac{2 \cdot 5 \cdot 2^{n+1} - 2^{n+3}}{5(2^{n+1}) - 2 \cdot 12 \cdot 2^{n-2}} \\
 &= \frac{2^{n+2} \cdot 5 - 2^{n+3}}{5 \cdot 2^{n+1} - 2 \cdot 12 \cdot 2^{n-2}} \\
 &= \frac{2^{n+2} (5 - 2)}{2^{n+1} (5 - 2)} \\
 &= 2 \cdot \frac{3}{3} \\
 &= 3
 \end{aligned}$$

$$\begin{aligned}
 3) \quad & \frac{5 \times 3^n - 9 \times 3^{n-2}}{3^n - 3^{n-1}} \\
 &= \frac{5 \times 3^n - 3 \times 3^{n-2}}{3^n - 3^{n-1}} \\
 &= \frac{5 \times 3^n - 3 \times 3^{n-2}}{3^n - 3^{n-1}} \\
 &= \frac{3 \cdot (5 - 1)}{3 \cdot (3 - 1)} \\
 &= \frac{3 \cdot 4}{3 \cdot 2} \\
 &= 2
 \end{aligned}$$

$$\begin{aligned}
 4) \quad & \frac{7^{n+2} - 35 \times 7^{n-1}}{11 \times 7^n} \\
 &= \frac{7^{n+2} - 5 \times 7 \times 7^{n-1}}{11 \times 7^n} \\
 &= \frac{7^{n+2} - 5 \times 7^n}{11 \times 7^n} \\
 &= \frac{7^n (7 - 5)}{11 \times 7^n} \\
 &= \frac{2}{11} \\
 &= \frac{2}{11}
 \end{aligned}$$



$$\begin{aligned}
 5) \quad & \frac{7 \times 3^x - 9 \times 3^{x-2}}{3^x - 3^{x-1}} \\
 &= \frac{7 \times 3^x - \underline{\hspace{1cm}} \times 3^{x-2}}{3^x - 3^{x-1}} \\
 &= \frac{7 \times 3^x - 3^{\underline{\hspace{1cm}}}}{3^x - 3^{x-1}} \\
 &= \frac{3^x (\underline{\hspace{1cm}} - \underline{\hspace{1cm}})}{3^x (\underline{\hspace{1cm}} - 3^{-1})} \\
 &= \frac{6}{\left(\frac{\underline{\hspace{1cm}}}{3} \right)} \\
 &= \underline{\hspace{1cm}}
 \end{aligned}$$

$$\begin{aligned}
 6) \quad & \frac{2(a^{-1} \times b^{-1})}{a^{-1}b^{-1}} \\
 &= \underline{\hspace{1cm}}
 \end{aligned}$$

$$\begin{aligned}
 7) \quad & \frac{2^{n+4} - 10 \cdot 2^{n+1}}{2^n + 2^{n-1}} \\
 &= \frac{2^{n+4} - 2 \cdot \underline{\hspace{1cm}} \cdot 2^{n+1}}{2^n + 2^{n-1}} \\
 &= \frac{2^{n+4} - \underline{\hspace{1cm}} \cdot 2^{n+1}}{2^n + 2^{n-1}} \\
 &= \frac{2^{n+1} (2^{\underline{\hspace{1cm}}} - 5)}{2^n (\underline{\hspace{1cm}} + 2^{\underline{\hspace{1cm}}})} \\
 &= 2^{\underline{\hspace{1cm}}} \frac{(\underline{\hspace{1cm}})}{\left(\frac{\underline{\hspace{1cm}}}{2} \right)} \\
 &= \frac{\underline{\hspace{1cm}}}{\underline{\hspace{1cm}}}
 \end{aligned}$$

$$\begin{aligned}
 8) \quad & \frac{7^{n+2} - 35 \times (7^{n-1})}{4(7^{n+1})} \\
 &= \frac{7^{n+2} - \underline{\hspace{1cm}} \times 7 \times (7^{n-1})}{4(7^{n+1})} \\
 &= \frac{7^{n+2} - \underline{\hspace{1cm}} \times 7^{\underline{\hspace{1cm}}}}{4(7^{n+1})} \\
 &= \frac{7^n (7^{\underline{\hspace{1cm}}} - \underline{\hspace{1cm}})}{4(7^{n+1})} \\
 &= \frac{\underline{\hspace{1cm}}}{\underline{\hspace{1cm}}}
 \end{aligned}$$