Name _____ Date _____

Lesson 1.3 Extra Practice

Simplify the expression. Write your answer as a power.

1. $\frac{3^7}{3^5}$ 3^2
2. $\frac{6^8}{6^5}$ 6^3
3. $\frac{8^9}{8^6}$ 8^3
4. $\frac{9^5}{9^3}$ 5^2
5. $\frac{7^6}{7^2}$ 7^4
6. $\frac{15^{14}}{15^{10}}$ 15^4
7. $\frac{9^{12}}{9^7}$ 9^5
8. $\frac{11^{13}}{11^8}$ 11^5

9. Your friend simplifies the quotient. Is your friend correct? Explain your reasoning.

$$\frac{8^{18}}{8^6} = 8^{\frac{18}{6}} = 8^3$$

NO needs to subtract
$18-6=12$
8^{12}

Simplify the expression. Write your answer as a power.

10. $\frac{4^8 \cdot 4^4}{4^2}$ $\frac{4^{12}}{4^2} = 4^{10}$
11. $\frac{3^3 \cdot 3^6}{3^4}$ $\frac{3^9}{3^4} = 3^5$
12. $\frac{2^{14}}{2^7 \cdot 2^4}$ $\frac{2^{14}}{2^{11}} = 2^3$
13. $\frac{7^9}{7^2 \cdot 7^5}$ $\frac{7^9}{7^7} = 7^2$
14. A personal computer developed in the 1980s had approximately 2^{18} bytes of memory. Your teacher's laptop has 16 gigabytes = 2^{34} bytes of memory. How many times more memory does your teacher's laptop have than the personal computer from the 1980s?

$\frac{2^{34}}{2^{18}}$ 2^{16}

Simplify the expression. Write your answer as a power.

15. $\frac{3^6}{3^4} \cdot \frac{3^7}{3^5}$ $3^2 \cdot 3^2 = 3^4$
16. $\frac{9^9}{9^3} \cdot \frac{9^6}{9^2}$ $9^6 \cdot 9^4 = 9^{10}$
17. $\frac{5^{10}}{5^4} \cdot \frac{5^8}{5^3}$ $5^6 \cdot 5^5 = 5^{11}$
18. $\frac{8^5}{8^2} \cdot \frac{8^4}{8^2}$ $8^3 \cdot 8^2 = 8^5$
19. $\frac{6^5}{6^4} \cdot \frac{6^9}{6^2}$ $6 \cdot 6^7 = 6^8$
20. $\frac{4^3 \cdot 4^5}{4^4} \cdot \frac{4^7}{4^2}$ $\frac{4^8}{4^4} \cdot \frac{4^7}{4^2}$

$4^4 \cdot 4^5 = 4^9$