

Name: _____

Period: _____ Date: _____

Exponents - Product & Quotient Rule

Section I. Simplify. Use the product rule

1. $4^3 \cdot 4^9 =$

2. $(-7)^5 \cdot (-7)^{12} =$

3. $15^4 \cdot 15^2 =$

4. $10^3 \cdot 10^8 =$

5. $(-6)^5 \cdot (-6)^8 =$

6. $4^3 \cdot 4^9 \cdot 4^7 =$

7. $3^4 \cdot 3^{-2} =$

8. $8^3 \cdot 8^{3+x} =$

Section II. Simplify. Use the quotient rule

9. $\frac{7^8}{7^3} =$

10. $\frac{x^6}{x^4} =$

11. $\frac{12^9}{12} =$

12. $\frac{(-2)^5}{(-2)^3} =$

13. $\frac{4^{x+9}}{4^6} =$

14. $\frac{(-11)^7}{(-11)^2} =$

15. $\frac{(-9)^5}{(-9)^7} =$

16. $\frac{3^4}{3^9} =$

Section III. Simplify. Use both the product and quotient rules.

17. $6^4 \cdot \frac{6^8}{6^3} =$

18. $\frac{14^5}{14} \cdot 14^9 =$

19. $(-8)^6 \cdot \frac{(-8)^7}{(-8)^3} =$

20. $1^{10} \cdot \frac{1^9}{1^4} =$

21. $\frac{9^8}{9^5} \cdot 9^{11} =$

22. $\frac{(-4)^5}{(-4)^4} \cdot (-4)^7 =$

23. $\frac{5^7}{5^3} \cdot \frac{5^9}{5^6} =$

24. $2^6 \cdot \frac{2^4}{2^4} =$

25. $\frac{4^5}{4^7} \cdot 4^2 =$

26. $6^5 \cdot \frac{6^4}{6^8} =$

27. $\frac{(-3)^8}{(-3)^5} \cdot \frac{(-3)^4}{(-3)^2} =$

28. $\frac{x^4}{x^2} \cdot \frac{x^9}{x^2} =$

29. $7^3 \cdot \frac{7^6}{7^3} \cdot \frac{7^5}{7} =$

30. $\frac{10^{4x+3}}{10^{x+1}} \cdot \frac{10^{2x}}{10^{x-5}} =$