Name:_____ Period:_____

Score:
_____/_____
_____%

HW 4-3: Multiply & Divide Monomials

Simplify using the Laws of Exponents.

1. $(-6)^2 \cdot (-6)^5$

2. $-4a^5(6a^5)$

3. $(-7a^4bc^3)(5ab^4c^2)$

4. $\frac{8^{15}}{8^{13}}$

5. $\frac{16t^4}{8t}$

6. $\frac{x^6y^{14}}{x^4y^9}$

7. $\frac{3^4x^4}{3x^2}$

8. $\frac{4^5 \cdot 5^3 \cdot 6^2}{4^4 \cdot 5^2 \cdot 6}$

9. $\frac{6^3 \cdot 6^6 \cdot 6^4}{6^2 \cdot 6^3 \cdot 6^3}$

10. $\frac{(-2)^5 \cdot (-3)^4 \cdot (-5)^3}{(-2)^3 \cdot (-3) \cdot (-5)^2}$

11. Evaluate the simplified answer in the previous problem using multiplication to get a single number. How can you tell if the answer will be a positive or negative number?

12. The processing speed of a certain computer is 10^{11} instructions per second. Another computer has a processing speed that is 10^3 times as fast. How many instructions per second can the faster computer process?

13. The table shows the seating capacity of two different facilities. About how many times as great is the capacity of Madison Square Garden in New York than a typical movie theater?

Place	Seating Capacity
Movie theater	3^5
Madison Square Garden	3^9

14. Refer to the information in the table.

a. How many times a s great is one quadrillion than one million?

b. One quintillion is one trillion times as great as what number?

Power of Ten	U.S. Name
10^3	one thousand
10^6	one million
10^9	one billion
10^{12}	one trillion
10^{15}	one quadrillion
10^{18}	one quintillion

Find each missing exponent.

15. $(6^{\bullet})(6^3) = 6^5$

16. $3x^{\bullet} \cdot 4x^3 = 12x^{12}$

17. $p^3 \cdot p^{\bullet} \cdot p^2 = p^9$

18. $\frac{3^{\bullet}}{3^2} = 3^4$

19. $\frac{5^9}{5^{\bullet}} = 5^4$

20. $2x^{\bullet} \cdot \frac{3x^2}{x^6} = 6x^3$

21. Write a multiplication expression with a product of $\mathbf{5^{13}}$.

22. Is $\frac{\mathbf{3^{100}}}{\mathbf{3^{99}}}$ *greater than, less than,* or *equal to* 3? Explain your reasoning.

23. What is twice $\mathbf{2^{30}}$? Write using exponents. Explain your reasoning.

24. Which expression is equivalent to $8x^2y \cdot 8yz^2$?

Ⓐ $64x^2y^2z^2$

Ⓑ $64x^2yz^2$

Ⓒ $16x^2y^2z^2$

Ⓓ $384x^2y^2z^2$

Simplify using the Laws of Exponents.

25. $(3x^8)(5x)$

26. $\frac{h^7}{h^6}$

27. $2g^2 \cdot 7g^6$

28. $(8w^4)(-w^7)$

29. $(-p)(-9p^2)$

30. $\frac{2^9}{2}$

31. $\frac{36d^{10}}{6d^5}$

32. $\frac{5^3 \cdot 7^4 \cdot 10}{5 \cdot 7^4}$

33. $\frac{(-3)^2 \cdot 4^3 \cdot (-1)^8}{4 \cdot (-1)^5}$

34. Will the answer in the previous problem be a positive or a negative number when evaluated? Explain

35. One meter is 10^3 times longer than one millimeter. One kilometer is 10^6 times longer than one millimeter. How many times longer is one kilometer than one meter?

Ⓐ 10^9 Ⓒ 10^3

Ⓑ 10^6 Ⓓ 10

36. Which of the following is equivalent to $\left(-\frac{2}{3}\right)^3$?

Ⓕ $-\frac{6}{9}$ Ⓗ $\frac{8}{27}$

Ⓖ $-\frac{8}{27}$ Ⓘ $\frac{6}{9}$

37. **Short Response** What is the area of the rectangle below?