

**Practice: Laws of Exponents, Negative & Zero Exponents**

\*\*\*Remember: If  $x$  is any real number, except zero, then:  $x^0 = 1$  and  $x^{-5} = \frac{1}{x^5}$

Directions: Simplify each expression. (Use positive exponents only!)

1. $2^{-7}$	2. $e^{-5}$	3. $(-x)^{-2}$
4. $y^0$	5. $n^{-10}$	6. $\frac{1}{4^{-3}}$

\*\*\*When multiplying terms that have the same base, keep the base and add the exponents.

Directions: Simplify each expression. Write your answers in exponential form.

7. $5^8 \cdot 5^3$	8. $m^4 \cdot m^2$	9. $(-3)^6 \cdot (-3)^7$
10. $x^2 \cdot x \cdot x^{10}$	11. $x^7 \cdot x^2 \cdot y^5$	12. $h \cdot h^9$

\*\*\*When dividing terms that have the same base, keep the base and subtract the exponents.

Directions: Simplify each expression. Write your answers in exponential form.

13. $\frac{8^7}{8^5}$	14. $\frac{k^9}{k}$	15. $\frac{e^2}{e^{10}}$
16. $\frac{(-2)^{20}}{(-2)^{17}}$	17. $\frac{3^4}{3^2}$	18. $\frac{n^4}{n^9}$

\*\*\*Use the term **M<sup>A</sup>D<sup>S</sup>** to help with multiplying and dividing.

*Directions: Simplify each expression. Write your answers using positive exponents only!*

19. $a^{-4} \cdot a^2$	20. $g^{-5} \cdot g^{-3}$	21. $x^3 \cdot y^2 \cdot x^5$
22. $\frac{e^{-2}}{e^2}$	23. $\frac{5^4}{5^{-2}}$	24. $\frac{x^4}{x}$
25. $w^2 \cdot w^3$	26. $x^3 \cdot x^{-2} \cdot x$	27. $2^8 \cdot 2^3$
28. $\frac{n^3}{n^7}$	29. $\frac{b^{10}}{b^3}$	30. $y^{-8} \cdot y^2$

*Directions: Determine the value of x in each expression.*

31. $3^7 \cdot 3^x = 3^{12}$	32. $6^x \cdot 6^8 = 6^{-5}$	33. $e^3 \cdot e^2 \cdot e^x = e^9$
34. $\frac{7^{10}}{7^x} = 7^8$	35. $\frac{5^x}{5^4} = 5^5$	36. $2^x \cdot 2^4 = 2^{12}$