

HW # 14**Laws of Exponents ($a \neq 0$)**

#1: $a^0 = 1$	#2: $a^{-n} = \frac{1}{a^n}$
#3: $a^m \cdot a^n = a^{m+n}$	#4: $\frac{a^m}{a^n} = a^{m-n}$

Simplify the expression by rewriting it as a single power with a positive exponent. Do not evaluate!

1. $\frac{9^{12}}{9^3}$

9^9

2. $\frac{6^7}{6^{11}}$

$6^{-4} = \frac{1}{6^4}$

3. $\frac{y^7}{y}$

y^6

4. $\frac{30x^7}{5x^3}$

$6x^4$

5. $3^4 \cdot 3^{-7}$

$3^{-3} = \frac{1}{3^3}$

6. $x^5 \cdot x^6$

x^{11}

7. $m^4 \cdot m$

m^5

8. $3^4 \cdot 3 \cdot 3^{-2}$

3^3

9. y^{-12}

$\frac{1}{y^{12}}$

10. $\frac{15^{-4}}{15^{-6}}$

15^2

11. $p^{14} \div p^{-6}$

p^{20}

12. $(-3a^3)(2a^5)$

$-6a^8$

Evaluate each numerical expression using the laws of exponents.

13. $125^{-9} \cdot 125^9$

$125^0 = 1$

14. $\frac{5^9 \cdot 5}{5^{12}}$

$\frac{5^{10}}{5^{12}} = 5^{-2}$

$\frac{1}{5^2} = \frac{1}{25}$