Algebra I
Study Guide 8.1-8.3

Name: **key**

I. Simplify the exponential expression, writing your answer as a fraction in simplest form.
LEAVE NO NEGATIVE EXPONENTS!

1. 10^{-2} $\frac{1}{10^2} = \boxed{\frac{1}{100}}$	2. $\left(\frac{2}{5}\right)^{-3}$ $\left(\frac{5}{2}\right)^3 = \frac{5^3}{2^3} = \boxed{\frac{125}{8}}$	3. $8^5(8^{-7})$ $8^{-2} = \frac{1}{8^2} = \boxed{\frac{1}{64}}$
4. $(-10)^0 \cdot \frac{1}{3^{-3}}$ $\frac{1 \cdot 3^3}{\boxed{27}}$	5. $\left(\frac{1}{2^{-2}}\right)^{-3}$ $\left(\frac{2^{-2}}{1}\right)^3 = \frac{2^{-6}}{1^3}$ $= \frac{1}{2^6} = \boxed{\frac{1}{64}}$	6. $\frac{3^{43}}{3^{40}} = 3^{43-40}$ $= 3^3$ $= \boxed{27}$

II. Rewrite the expression with **positive exponents**.

7. $\left(3x^9y^2\right)^4$ $3^4 x^{36} y^8$ $\boxed{81 x^{36} y^8}$	8. $\left(\frac{x^6}{y^3}\right)^2\left(\frac{y^{10}}{x^3}\right)^2$ $= \left(\frac{x^{12}}{y^6}\right)\left(\frac{y^{20}}{x^6}\right)$ $= \frac{x^{12} y^{20}}{x^6 y^6} = \boxed{x^6 y^{14}}$	9. $\frac{\left(2x^2\right)^3}{6x^4} = \frac{2^3 x^6}{6x^4}$ $= \frac{8x^6}{6x^4}$ $= \boxed{\frac{4x^2}{3}}$
10. $6x^3 \cdot 3x^{-4}$ $18x^{-1}$ $\boxed{\frac{18}{x}}$	11. $\left(201x^6\right)^{-8}\left(201x^6\right)^8$ $\left(201x^6\right)^0$ $\boxed{1}$	12. $\frac{5a^2b^7}{(2ab)^{-3}}$ $5a^2b^7 \cdot (2ab)^3$ $5a^2b^7 \cdot 8a^3b^3$ $\boxed{40a^5b^{10}}$

13. $\dfrac{8u^4v^8}{-2u^2v^{11}}$

$$\boxed{\dfrac{-4u^2}{v^3}}$$

14. $\left(\dfrac{4k^2m^2}{16k^5m^3}\right)^{-1}$

$$\dfrac{16k^5m^3}{4k^2m^2}$$

$$\boxed{4k^3m}$$

15. $\left(-4x^{-3}y^4\right)^2\left(8x^2y^5\right)$

$$\left(16x^6y^8\right)\left(8x^2y^5\right)$$

$$\boxed{128x^8y^{13}}$$

16. $\left(\dfrac{56x^{12}y^4}{8x^{-3}y^{15}}\right)^2$

$$\left(\dfrac{7x^{15}}{y^{11}}\right)^2$$

$$\boxed{\dfrac{49x^{30}}{y^{22}}}$$

17. $\dfrac{\left(3a^4b^2\right)^{-3}}{9a^{-3}b^8}$

$$\dfrac{1}{9a^{-3}b^8\cdot(3a^4b^2)^3}$$

$$\dfrac{1}{9a^{-3}b^8\cdot 27a^{12}b^6}$$

$$\boxed{\dfrac{1}{243a^9b^{14}}}$$

18. $(-11)^{-2}y^0$

$$\dfrac{1}{(-11)^2}=\boxed{\dfrac{1}{121}}$$

19. $(-6a^3b)(2a^{-3}b^{-5})$

$$-12a^0b^{-4}$$

$$=\boxed{\dfrac{-12}{b^4}}$$

20. $\dfrac{9x^0y^2z^{-6}}{36z^2y^9}$

$$\dfrac{y^2}{4z^2\cdot z^6\cdot y^9}$$

$$=\boxed{\dfrac{1}{4z^8y^9}}$$

21. $(5p^{-3}q)^2(3p^8q^4)$

$$25p^{-6}q^2\cdot 3p^8q^4$$

$$\boxed{75p^2q^6}$$