

Advanced Algebra

Name _____ hr _____

Exponent Rules and Shortcuts Practice –

MULTIPLYING LIKE BASES	Shortcut: $b^m b^n = b^{m+n}$	
DIVIDING LIKE BASES	Shortcut: $\frac{b^m}{b^n} = b^{m-n}$	
PARENTHESIS EXPONENTS	Shortcut: $(ab)^n = a^n b^n$	and $(b^m)^n = b^{m \cdot n}$
NEGATIVE EXPONENTS	Shortcuts: $b^{-m} = \frac{1}{b^m}$	and $\frac{a^{-n}}{b^{-m}} = \frac{b^m}{a^n}$
ZERO EXPONENTS	Shortcut: $b^0 = 1$	

Use the shortcuts to simplify these expressions. They should be quick one-step problems.

1. $b^2 b^6$

5. $\frac{x^9}{x^3}$

9. $a^4 b^{-3}$

2. $\frac{x^2}{x}$

6. x^0

10. $(a^2 b c^7)^{11}$

3. $(2xy^2)^0$

7. $a^7 a^{-3}$

11. $a^{10} b^{-2} c^{-5}$

4. $(x^5)^6$

8. $(a^2)^9$

Use two of the rules together to simplify these expressions.

1. $(2x^2)^2 x^5$

4. $\frac{(2x^2)^2}{x^5}$

2. $(a^3 b^2)^7 ab^3$

5. $x^{-1} y^2 z^3 x^{-2} y^3 z^7$

3. $\frac{(a^3 b^2)^7}{ab^3}$

6. $a^5 b^7 c^3 a^{-4} b^3 c^{-7}$

7. $(x^2y^4)^{-2}$

9. $\left(\frac{a^6}{2b}\right)^3$

8. $(a^4b^9)^{-10}$

10. $\frac{4w^{-11}y^{-3}}{16w^{-51}y^7}$

All Together Now – remember what third (& fourth) roots means!

1. $\sqrt[3]{54x^6y^9}$

5. $(6^5\sqrt{6})(\sqrt{6^3})$

2. $\left(\frac{b^xb^{3x}}{b^3}\right)^2$

6. $\frac{a^2b^{\frac{1}{3}}c^{-1}}{a^{\frac{1}{2}}b^{\frac{4}{3}}c^2}$

3. $2^{3k+1}4^{k-1}$

7. $\frac{x^2y^{-3}z^{-1}}{\left(a^{\frac{2}{5}}b^{\frac{1}{5}}c^{\frac{3}{5}}\right)^{10}}$

4. $\left(x^{\frac{1}{2}}y^{\frac{1}{5}}\right)^{20}$