

Intermediate Algebra B
7.2A Properties of Exponents

Name Key
Hour _____

Simplify the following expressions using the properties of exponents.

1. $x^3 \cdot x^{-1} \cdot x^5$

$$x^{3+(-1)+5}$$

$$\boxed{x^7}$$

2. $(3x^2y^4)^3$

$$3^{1 \cdot 3} x^{2 \cdot 3} y^{4 \cdot 3}$$

$$3^3 x^6 y^{12}$$

$$\boxed{27x^6y^{12}}$$

3. $(a^{-2}bc^3)(a^3b^{-1}c)$

$$a^{-2+3} b^{1+(-1)} c^{3+1}$$

$$a^1 b^0 c^4$$

$$ac^4$$

4. $(2xy^3z)^2(3x^2z^4)$

$$2^{1 \cdot 2} x^{1 \cdot 2} y^{3 \cdot 2} z^{1 \cdot 2}$$

$$2^2 x^2 y^6 z^2 \cdot 3x^2 z^4$$

$$4x^2 y^6 z^2 3x^2 z^4$$

$$4 \cdot 3 x^{2+2} y^6 z^{2+4}$$

$$12x^4 y^6 z^6$$

$$\boxed{12x^4 y^6 z^6}$$

5. $(4a^3)^{-2}$

$$4^{1 \cdot (-2)} a^{3 \cdot (-2)}$$

$$4^{-2} a^{-6}$$

$$\frac{1}{4^2 a^6} = \frac{1}{16a^6}$$

$$\boxed{\frac{1}{16a^6}}$$

6. $(-2x^0y)^3$

$$-2^{1 \cdot 3} x^{0 \cdot 3} y^{1 \cdot 3}$$

$$-2^3 x^0 y^3$$

$$\boxed{-8y^3}$$

7. $\frac{5xy^3}{15x^3z}$

$$\frac{5}{15} x^{1-3} y^3 z$$

$$\frac{1}{3} x^{-2} y^3 z$$

$$\frac{1y^3z}{3x^2}$$

$$\boxed{\frac{1y^3z}{3x^2}}$$

8. $\frac{6x^{-3}y}{3y^{-2}}$

$$\frac{6}{3} x^{-3} y^{1-(-2)}$$

$$2 x^{-3} y^3$$

$$\frac{2y^3}{x^3}$$

$$\boxed{\frac{2y^3}{x^3}}$$

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

$$\frac{x^{1 \cdot 3}}{2^{1 \cdot 3}} = \frac{x^3}{2^3}$$

$$\boxed{\frac{x^3}{8}}$$

10. $6x^{-2}y$

$$\frac{6y}{x^2}$$

$$\boxed{\frac{6y}{x^2}}$$

11. $\frac{-4mn^2}{3m^5n^7}$

$$\frac{-4}{3} m^{1-5} n^{2-7}$$

$$\frac{-4}{3} m^{-4} n^{-5}$$

$$\frac{-4}{3m^4n^5}$$

$$\boxed{\frac{-4}{3m^4n^5}}$$

12. $(4xyz)^0$

$$4^{1 \cdot 0} x^{1 \cdot 0} y^{1 \cdot 0} z^{1 \cdot 0}$$

$$4^0 x^0 y^0 z^0$$

$$= 1 \cdot 1 \cdot 1 \cdot 1 =$$

$$\boxed{1}$$