

Name: Key Date: \_\_\_\_\_ Period: \_\_\_\_\_

Algebra 1  
Properties of Exponents  
Day 2

Warm Up: Simplify the following.

1.)  $x^4 \cdot x^5$   
 $x^9$

2.)  $2x^4 \cdot 5x^5$   
 $10x^9$

3.)  $(x^4)^5$   
 $x^{20}$

4.)  $(2x^4)^5$   
 $32x^{20}$

5.)  $(x^3y)^2$   
 $x^6y^2$

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

**Rule # 4: Zero Property of Exponents** For every nonzero number  $a$ ,  $a^0 = 1$

Any nonzero number raised to the zero power = 1.

1.)  $4^0 = 1$

2.)  $(-4)^0 = 1$

3.)  $-4^0 = -1$

4.)  $(4x)^0 = 1$

5.)  $\left(\frac{1}{4}x^2y^4\right)^0 = 1$

6.)  $-5x^0y$   
 $-5(1)y$   
 $-5y$

**Rule # 5: Negative Exponents** For every nonzero number  $a$ ,  $a^{-n} = \frac{1}{a^n}$

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

2.)  $\frac{1}{5^{-2}} = 5^2 = 25$

3.)  $a^{-2}b^3 = \frac{b^3}{a^2}$

4.)  $(-6)^{-2} = \frac{1}{(-6)^2}$   
 $= \frac{1}{36}$

5.)  $4x^{-3}y^2 = \frac{4y^2}{x^3}$

6.)  $-9x^{-5}y^3 = \frac{-9y^3}{x^5}$

$$7.) \frac{2x^{-8}}{3} = \boxed{\frac{2}{3x^8}}$$

$$8.) \frac{1}{4a^{-4}} = \boxed{\frac{a^4}{4}}$$

$$9.) \frac{m^{-3}}{n^{-4}} = \boxed{\frac{n^4}{m^3}}$$

**Mixed Review: Simplify Completely.**

$$1.) 5x^{-2} \cdot 7x^5 = \boxed{35x^3}$$

$$2.) (x^{-1}y^3z)^{-2} = \boxed{\frac{x^2}{y^6z^2}}$$

$$3.) -8x^0 = \boxed{-8}$$

$$4.) (-4a^2)^0 = \boxed{1}$$

$$5.) (-2)^{-3} = \boxed{\frac{1}{-8}}$$

$$6.) \frac{-6x^{-1}}{7} = \boxed{\frac{-6}{7x}}$$

$$7.) \frac{q^{-2}r^0}{s^0} = \boxed{\frac{1}{q^2}}$$

$$8.) \frac{2}{3}m^{-1}n^5 = \boxed{\frac{2n^5}{3m}}$$

$$9.) 4x^{-6}y^{-2} = \boxed{\frac{4}{x^6y^2}}$$

**Evaluate each expression for the given value(s) of the variable(s).**

$$1.) x^{-4} \text{ for } x=4$$

$$(4)^{-4} = \frac{1}{4^4} = \boxed{\frac{1}{256}}$$

$$\frac{1}{x^4} = \text{or } \frac{1}{4^4} = \frac{1}{256}$$

$$3.) r^0s^{-2} \text{ for } r=-3, s=5$$

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

$$\text{or } (-3)^0(5)^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

$$2.) (10-d)^0 \text{ for } d=11$$

$$\boxed{1}$$

$$4.) 10m^{-1}n^{-5} \text{ for } m=10 \text{ and } n=-2$$

$$\frac{10}{mn^5} = \frac{10}{10(-2)^5} = \boxed{-\frac{1}{32}}$$