

## Off-Site Learning Packet Day 1

### Integral Exponents

If  $c$  and  $d$  are nonzero real numbers and  $m$  and  $n$  are integers (positive, negative, or zero), then we have these

#### Exponent Laws

- $c^m c^n = \underline{\quad c^{m+n} \quad}$
- $\frac{c^m}{c^n} = \underline{\quad c^{m-n} \quad}$
  
- $(c^m)^n = \underline{\quad c^{mn} \quad}$
  
- $(cd)^m = \underline{\quad c^m d^m \quad}$
  
- $\left(\frac{c}{d}\right)^m = \underline{\quad \frac{c^m}{d^m} \quad}$
  
- $c^{-n} = \underline{\quad \frac{1}{c^n} \quad}$

Example 5:

a)  $\pi^{-5}\pi^{-2}$

$$\pi^{-7} = \frac{1}{\pi^7}$$

c)  $\frac{x^9}{x^4}$

$$x^5$$

e)  $(5^{-3})^2$

$$5^{-6} = \frac{1}{5^6}$$

b)  $(2x)^5$

$$2^5 x^5 = 32x^5$$

d)  $\left(\frac{7}{3}\right)^{10}$

$$\frac{7^{10}}{3^{10}}$$

f)  $\frac{1}{x^{-5}}$

$$x^5$$

The exponent laws can often be used to simplify complicated expressions.

Example 6:

a)  $(2x^2y^3z)^4$

$$2^4x^8y^{12}z^4 = 16x^8y^{12}z^4$$

b)  $(r^{-3}s^2)^{-2}$

$$r^6s^{-4} = \frac{r^6}{s^4}$$

c)  $\frac{x^5(y^2)^3}{(x^2y)^2}$

$$\frac{x^5y^6}{x^4y^2} = xy^4$$

Example 7:

Simplify and express without negative exponents.

$$\frac{a^{-2}(b^2c^3)^{-2}}{(a^{-3}b^{-5})^2c}$$

$$\frac{a^{-2}b^{-4}c^{-6}}{a^{-6}b^{-10}c} = \frac{a^4b^6}{c^7}$$

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**Off-Site Learning Packet Day 1****Simplify.**

1.  $n \cdot 3n^2$

2.  $v^2 \cdot 2v^2$

2.  $n^3 \cdot 3n$

4.  $2x^0 \cdot 2x$

5.  $2m^0 \cdot 3m^2$

**Simplify. Your answer should contain only positive exponents.**

6.  $(x^{-5}y^5)^0 \cdot x^0y^0$

7.  $-n^3 \cdot (-nm^{-3})^0 \cdot -m^{-4}n^3$

8.  $(-x^{-4}y^0)^4 \cdot yx^2$

9.  $((xy^2)^{-3} \cdot x^{-5}y^5)^3$

10.  $-x^0y^3 \cdot (-yx^4)^3 \cdot -yx^5$

**Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.**

11. 
$$\frac{ba^{-\frac{3}{2}} \cdot \left(b^{-\frac{5}{4}}\right)^{\frac{1}{4}}}{a^{-1}b^0}$$

12. 
$$\frac{\left(u^{\frac{4}{3}}v^{\frac{3}{2}}\right)^2 \cdot v^{\frac{3}{2}}}{\left(u^{\frac{3}{2}}v^{\frac{5}{3}}\right)^0}$$

13. 
$$\frac{\left(x^0y^2 \cdot y^{-\frac{1}{2}}\right)^{-\frac{2}{3}}}{x}$$

14. 
$$\frac{a^{-\frac{3}{4}}b^{-1}}{\left(ba^{\frac{1}{2}} \cdot ab^{\frac{1}{4}}\right)^{\frac{1}{2}}}$$