

# Algebra I

## 8-3

### Laws of Exponents

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1)  $\frac{x^9}{x^5} = x^4$

2)  $x^1 = x$

3)  $(x^3)^5 = x^{15}$

4)  $\frac{x^2}{x^7} = \frac{1}{x^5}$  or  $x^{-5}$

5)  $x^5 \cdot x^2 = x^7$

6)  $x^0 = 1$

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

8)  $-3^{-2} = -\frac{1}{9}$

$x^5(1) = x^5$   
 $x^5(\frac{1}{x}) = x^5$

1) When multiplying, add the powers.

2) When dividing, subtract the powers.

3) When the power is outside the parentheses, multiply the powers.

4) A negative power means reciprocal.  
(one over)

Simplify.

1)  $4 \cdot 5^{-2}$   
 $4 \cdot \frac{1}{25}$   
 $\frac{4}{25}$

2)  $(-5)^{-4} \cdot (-5)^4$   
 $(-5)^0$   
 $1$

3)  $[(-5)^{-4}]^4$   
 $(-5)^{-16}$   
 $\frac{1}{5^{16}}$

4)  $\frac{1}{4^{-2}} = \frac{4^2}{1}$   
 $16$

5)  $\frac{x^2}{x^{-3}}$   
 $\frac{x^2}{1} \cdot \frac{1}{x^{-3}}$   
 $\frac{x^2}{1} \cdot \frac{x^3}{1}$   
 $x^5$

$\frac{x^2}{x^{-3}} = x^{2-(-3)}$   
 $= x^5$

6)  $(\frac{1}{8})^{-1} = 8$

7)  $(-\frac{5}{3})^{-3}$   
 $(-\frac{3}{5})^3$   
 $= -\frac{3^3}{5^3}$   
or  $-\frac{27}{125}$

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

9)  $(\frac{x^2}{y^{-1}})^{-2} (\frac{y^2}{x^{-1}})^3$   
 $\frac{x^{-4}}{y^2} \cdot \frac{y^4}{x^{-2}}$   
 $\frac{x^2 y^4}{y^2 x^4}$   
 $\frac{y^2}{x^2}$

Assignment:  
pg. 506  
3-43 odd,  
44, 45,  
50-53 all,  
55, 56a, 57a