

Precalculus Preview  
Exponents

**Properties of Exponents**

	Property	Example
Negative Exponent Rule	$b^{-n} = \frac{1}{b^n}$	$5^{-3} =$ $\frac{1}{4^{-2}} =$
Zero Exponent Rule	$b^0 = 1$	$7^0 =$
Product Rule	$b^m \cdot b^n = b^{m+n}$	$2^2 \cdot 2^3 =$
Power Rule	$(b^m)^n = b^{mn}$	$(x^3)^4 =$
Quotient Rule	$\frac{b^m}{b^n} = b^{m-n}$	$\frac{3^8}{3^4} =$
Products Raised to Powers	$(ab)^n = a^n b^n$	$(-2xy)^3 =$
Quotients Raised to Powers	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$	$\left(\frac{-3}{x}\right)^2 =$
Rational Exponents	$a^{\frac{m}{n}} = \sqrt[n]{a^m}$	$27^{\frac{3}{2}} =$

**Example 1:** Simplify and write all answers with positive exponents.

a.  $(-3x^4y)(8x^7y^9) =$

b.  $\left(\frac{48x^4y^7}{-12x^6y^{-3}}\right)^3$

c.  $\frac{1}{(3x^5)^{-3}}$

d.  $\left(\frac{3x^{-2}y^4}{4x^{-1}y^5}\right)^{-2}$

e.  $(-5x^2y^{-3})^2$

f.  $\left(-\frac{4}{y^2}\right)^3$

g.  $\frac{15a^{-3}b^{-4}c^{-3}}{18a^2b^6c^{-3}}$

h.  $(-2x^5)^{-3}$

i.  $\left(\frac{4x^2}{3y}\right)^{-2}$

j.  $(3x^{-4}yz^{-7})(3x)^{-3}$

k.  $(16x^8y^{12})^{\frac{1}{4}}$

l.  $\left(3x^{\frac{2}{3}}\right)\left(4x^{\frac{3}{4}}\right)$

m.  $\frac{72x^{\frac{3}{4}}}{9x^{\frac{1}{3}}}$

n.  $\frac{\left(2y^{\frac{1}{5}}\right)^4}{y^{\frac{3}{10}}}$

o.  $\sqrt[4]{7^2}$

p.  $\sqrt[9]{x^6}$