

Algebra H  
8.2-8.3 ReviewName:  
Period: *Key*

## Fraction - Quotient Property

Expression	Expression as repeated multiplication	Simplified Expression	Simplified Expression as Power
$\frac{2^7}{2^2}$	$\frac{\cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{\cancel{2} \cdot \cancel{2}}$	$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	$2^5 = 32$
$\frac{(-4)^6}{(-4)^3}$	$\frac{\cancel{-4} \cdot \cancel{-4} \cdot \cancel{-4} \cdot -4 \cdot -4 \cdot -4}{\cancel{-4} \cdot \cancel{-4} \cdot \cancel{-4}}$	$-4 \cdot -4 \cdot -4$	$(-4)^3 = -64$
$\frac{x^5}{x^3}$	$\frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}}$	$x \cdot x$	$x^2$

Generalize your findings:

$$\therefore \frac{a^m}{a^n} = a^{m-n}$$

$$1) \frac{4^3}{4^1} = 4^2 = 16 \quad 2) \frac{x^4 y^5}{y^2} = x^4 y^3 \quad 3) \frac{2a^{16}}{2a^7} = \frac{a^9}{2} \quad 4) \frac{4m^{18}n^7}{24m^9n^2} = \frac{m^9n^5}{6}$$

## Fraction - Power Property

Expression	Expanded Expression	Product of Fractions	Simplified Expression
$\left(\frac{5}{8}\right)^3$	$\left(\frac{5}{8}\right) \cdot \left(\frac{5}{8}\right) \cdot \left(\frac{5}{8}\right)$	$\frac{5 \cdot 5 \cdot 5}{8 \cdot 8 \cdot 8}$	$\frac{5^3}{8^3}$
$\left(-\frac{4}{7}\right)^5$	$\left(-\frac{4}{7}\right) \left(-\frac{4}{7}\right) \left(-\frac{4}{7}\right) \left(-\frac{4}{7}\right) \left(-\frac{4}{7}\right)$	$\frac{-4 \cdot -4 \cdot -4 \cdot -4 \cdot -4}{7 \cdot 7 \cdot 7 \cdot 7 \cdot 7}$	$\frac{(-4)^5}{7^5}$

Generalize your findings:

$$\therefore \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$5) \left(-\frac{4}{5}\right)^3 = \frac{(-4)^3}{5^3} = \frac{-64}{125} \quad 6) \left(\frac{q \cdot q^2}{t}\right)^4 = \left(\frac{q^3}{t}\right)^4 = \frac{q^{12}}{t^4} \quad 7) \left(\frac{24a^5}{16a^2}\right)^3 = \left(\frac{3a^3}{2}\right)^3 = 3^3 a^9 \sqrt[3]{9a^9}$$

$$5) \left(\frac{-1}{5}\right) = \frac{-1}{5^3} = \frac{-67}{125}$$

$$6) \left(\frac{-}{t}\right) = \left(\frac{-}{t}\right) = \frac{9^{12}}{t^4}$$

$$7) \left(\frac{2}{16a^2}\right) = \left(\frac{2}{2^4}\right) = \frac{3^3 a^9}{2^3} = \frac{9a^9}{8}$$

### More Practice....

$$1) \frac{5^8}{5^3} = 5^3 = 125$$

$$2) \frac{3b^{11}}{18b^3} = \frac{b^8}{6}$$

$$3) \frac{8^{17}}{8^3 \cdot 8^7} = \frac{8^{17}}{8^{10}} = 8^7$$

$$4) \left(\frac{a^3}{2b^5}\right)^4 = \frac{a^{12}}{2^4 b^{20}} = \frac{a^{12}}{16b^{20}}$$

$$5) \frac{z^9}{z} = z^8$$

$$6) \left(\frac{2m^5}{m^2}\right)^3 = \left(\frac{2m^3}{1}\right)^3 = 8m^9$$

$$7) \left(\frac{1}{4}\right)^5 \cdot 4^{13} = \left(\frac{1^5}{4^5}\right) \cdot 4^{13} = \frac{4^{13}}{4^5} = 4^8$$

$$8) \left(\frac{6m^2}{3mn^4}\right)^3 = \left(\frac{2m}{n^4}\right)^3 = \frac{8m^3}{n^{12}}$$

### Zero or Negative Exponent Properties

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

$$\frac{1}{a^{-n}} = a^n$$

$$1) 1000^0 = 1$$

$$2) \frac{1}{4^0} = \frac{1}{1} = 1$$

$$3) 6^0 \cdot 6 = 1 \cdot 6 = 6$$

$$4) 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$5) 55^{-1} = \frac{1}{55}$$

$$6) 9^{-x} = \frac{1}{9^x}$$

$$7) \frac{1}{8^{-2}} = \frac{1}{64}$$

$$8) \frac{1}{x^{-7}} = x^7$$

$$11) \frac{x}{x^{-2}y^{-4}} = x^3 y^4$$

$$12) \frac{y^{-5}}{x^{-3}y} = \frac{x^3}{y^6}$$

$$13) \frac{3a^{-5}b}{24b^{-2}} = \frac{b^3}{8a^5}$$

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