

- (21) 1  
 (23)  $\frac{1}{16}$   
 (25)  $\frac{1}{343}$   
 (27) 256  
 (29)  $\frac{1}{8}$   
 (31)  $\frac{1}{36}$   
 (33) 64

- (35)  $\frac{1}{9}$   
 (37)  $\frac{1}{400}$   
 (39)  $\frac{1}{16}$   
 (41) 0.0313  
 (43) 0.0016  
 (45) 0.0625

- (47) 0.0714  
 (49) The 5 should not be raised to a negative power,  $\frac{5}{x^3}$   
 (51)  $\frac{1}{x^5}$   
 (53)  $\frac{y^4}{x^2}$   
 (55)  $x^2$   
 (57)  $x^{10}y^4$   
 (59)  $\frac{1}{64x^3}$   
 (61)  $\frac{216}{x^3}$

# 8.4 Division Properties of Exponents

**Feb. 21, 2007**

Recall

$$\frac{4^5}{4^3} = \frac{4 \cdot 4 \cdot 4 \cdot 4 \cdot 4}{4 \cdot 4 \cdot 4} = \frac{4^2}{1} = 4^2$$

How do we get there?

we think that we should sub. the exp.

Quotient of Powers: to divide Powers with the Same Base, you Subtract the Exponents.

ex1

$$\frac{6^5}{6^4} = 6^{5-4} = 6^1 = \underline{\underline{6}}$$

All #'s  
must be  
taken to their  
exponents,  
unless told  
otherwise!

ex2

$$\frac{x^3}{x^5} = x^{3-5} = x^{-2} = \frac{1}{\underline{\underline{x^2}}}$$

ex3

$$\frac{(-3)^3}{(-3)^2} = (-3)^{3-2} = (-3)^1 = \underline{\underline{-3}}$$

Power of a Quotient: First find the Power of the Numerator, then find the Power of the Denominator, and Divide.

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Recall:

$$\left(\frac{2}{3}\right)^4 = \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{2 \cdot 2 \cdot 2 \cdot 2}{3 \cdot 3 \cdot 3 \cdot 3} = \frac{2^4}{3^4} = \frac{16}{81}$$

Prod. of Power Add Expt.  
\* Power of Power Multiply Expt.  
Power of Prod. Power of Each + Multi  
Quot. of Power Subt. Expt.  
Power of Quot. Power of Each + Divide

$$\text{ex4)} \quad \left(\frac{2}{3}\right)^2 = \frac{2^2}{3^2} = \frac{4}{9}$$

$$\text{ex5)} \quad \left(\frac{-3}{y}\right)^3 = \frac{(-3)^3}{y^3} = \frac{-27}{y^3}$$

$$\text{ex6)} \quad \left(\frac{7}{4}\right)^{-3} = \frac{7^{-3}}{4^{-3}} = \frac{4^3}{7^3} = \frac{64}{343}$$

$$\text{ex7)} \quad \left(\frac{3}{5}\right)^{-2} = \frac{3^{-2}}{5^{-2}} = \frac{5^2}{3^2} = \frac{25}{9}$$

ex 8

$$\frac{2x^2y}{3x} \cdot \frac{9xy^2}{y^4} = \frac{6\cancel{18}x^3y^3}{1\cancel{3}xy^4} = \frac{6x^{3-1}y^{3-4}}{1}$$

Something from the top will cancel or reduce w/ something from the bottom

$$= 6x^2y^{-1} = \frac{6x^2}{y}$$

$$= \frac{6\cancel{18}x^2y^3}{1\cancel{3}xy^4} = \frac{6x^2}{y}$$

ex 9)

$$\left(\frac{2x}{y^2}\right)^4 = \frac{(2x)^4}{(y^2)^4} = \frac{2^4 \cdot x^4}{y^{2 \cdot 4}} = \frac{16x^4}{y^8}$$

Power of a Prod.

Power of a Quot.

Power of a Power



ex 10)

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

$$= \frac{x y}{1} \cdot \frac{y^3}{x^6} = \frac{y^4}{x^5}$$

O.T.L.  
\* ① Pg 452-453

21-61 (odd)

② Pg 464-465: 1, 2, 4-10(e).

19-23(o), 26-32(e), ③ Turn in  
Grade Sheets

33-57(o)

Show All Work ④ Turn in  
Wk. St. 8.1  
Not Just the Answers! by Fan

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$$3^0 = \underline{\underline{1}}$$

$$0^0 = \underline{\text{undefined}}$$