



More work with exponents will allow you investigate the next exponent rule. The goal of all exponent rules is to simplify the expression leaving only one base.

Example 1:

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

Example 2:

$$\frac{10^2}{10^5} = \frac{\cancel{10} \cdot \cancel{10}}{\cancel{10} \cdot \cancel{10} \cdot 10 \cdot 10 \cdot 10} = \frac{1}{10 \cdot 10 \cdot 10} = \frac{1}{10^3}$$

1. Now try some more problems like this. Be sure to show all three steps as modeled above.

a. $\frac{5^5}{5^4} = \frac{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}{5 \cdot 5 \cdot 5 \cdot 5} =$

b. $\frac{6^7}{6^3} =$

c. $\frac{3^8}{3^2} =$

d. $\frac{4^5}{4^5} =$

e. $\frac{10^3}{10^5} =$

f. $\frac{x^1}{x^4} =$



2. What is a shortcut for doing problems like these? Explain.

Quotient of Powers Rule - (Part of Skill 12)

When dividing two powers with the same exponent, keep the base and subtract the exponents.

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

3. Use exponent rules to simplify and write each expression with one positive exponent.

a. $\frac{7^9}{7^6} =$

b. $\frac{y^4}{y^1} =$

c. $\frac{2^{10}}{2^5} =$

d. $\frac{z^5}{z^{10}} =$

e. $\frac{5^{11}}{5^{11}} =$

f. $\frac{3^{19}}{3^{20}} =$

g. $\frac{m^0}{m^6} =$

h. $\frac{c^{-2}}{c^6} =$

i. $\frac{4^{16}}{4^{23}} =$

j. $\frac{x^7}{x^{-5}} =$

k. $\frac{n^{-4}}{n^{-9}} =$

l. $\frac{u^8}{u^{-11}} =$

Name _____

Exponents and Division

Date _____ Period _____

Simplify, leaving your answer in exponent form with only positive exponents.

1) $\frac{5^4}{5}$

2) $\frac{3}{3^3}$

3) $\frac{2^2}{2^3}$

4) $\frac{2^4}{2^2}$

5) $\frac{3r^3}{2r}$

6) $\frac{7k^2}{4k^3}$

7) $\frac{10p^4}{6p}$

8) $\frac{3b}{10b^3}$

9) $\frac{8m^3}{10m^3}$

10) $\frac{7n^3}{2n^5}$

$$11) \frac{2n^2}{n}$$

$$12) \frac{8x^3}{10x^5}$$

$$13) \frac{12x^3}{9y^8}$$

$$14) \frac{14x^4y^7}{6x^5y^4}$$

$$15) \frac{11u^4}{17u^7v^9}$$

$$16) \frac{4y^4}{14yx^8}$$

$$17) \frac{12yx^4}{10yx^8}$$

$$18) \frac{18x^8y^8}{10x^3}$$

$$19) \frac{5n^8}{20n^8}$$

$$20) \frac{16yx^4}{9x^8y^2}$$

Problem 2 Dividing Numbers in Scientific Notation

Demographics Population density describes the number of people per unit area.

During one year, the population of Angola was 1.21×10^7 people. The area of Angola is $4.81 \times 10^5 \text{ mi}^2$. What was the population density of Angola that year?

Got It? 2. During one year, Honduras had a population of 7.33×10^6 people. The area of Honduras is $4.33 \times 10^4 \text{ mi}^2$. What was the population density of Honduras that year?

Simplify each quotient. Write each answer in scientific notation.

24. $\frac{5.2 \times 10^{13}}{1.3 \times 10^7}$

25. $\frac{3.6 \times 10^{-10}}{9 \times 10^{-6}}$

26. $\frac{6.5 \times 10^4}{5 \times 10^6}$

27. $\frac{8.4 \times 10^{-5}}{2 \times 10^{-8}}$

28. $\frac{4.65 \times 10^{-4}}{3.1 \times 10^2}$

29. $\frac{3.5 \times 10^6}{5 \times 10^8}$