

Why does it work?

Alex and Morgan were asked to simplify  $\frac{6^5}{6^4}$

Alex's "subtract the exponents" way

Morgan's "canceling factors" way

$$\frac{6^5}{6^4}$$



$$6^{5-4}$$



$$6^1$$



$$6$$

I subtracted the exponents.

I am left with 6 to the first power.

That is the same thing as 6.



$$\frac{6^5}{6^4}$$



$$\frac{6 \times 6 \times 6 \times 6 \times 6}{6 \times 6 \times 6 \times 6}$$



$$6$$

I expanded the powers in the numerator and the denominator.

I then canceled the common factors in the numerator and the denominator, and I got 6 left.



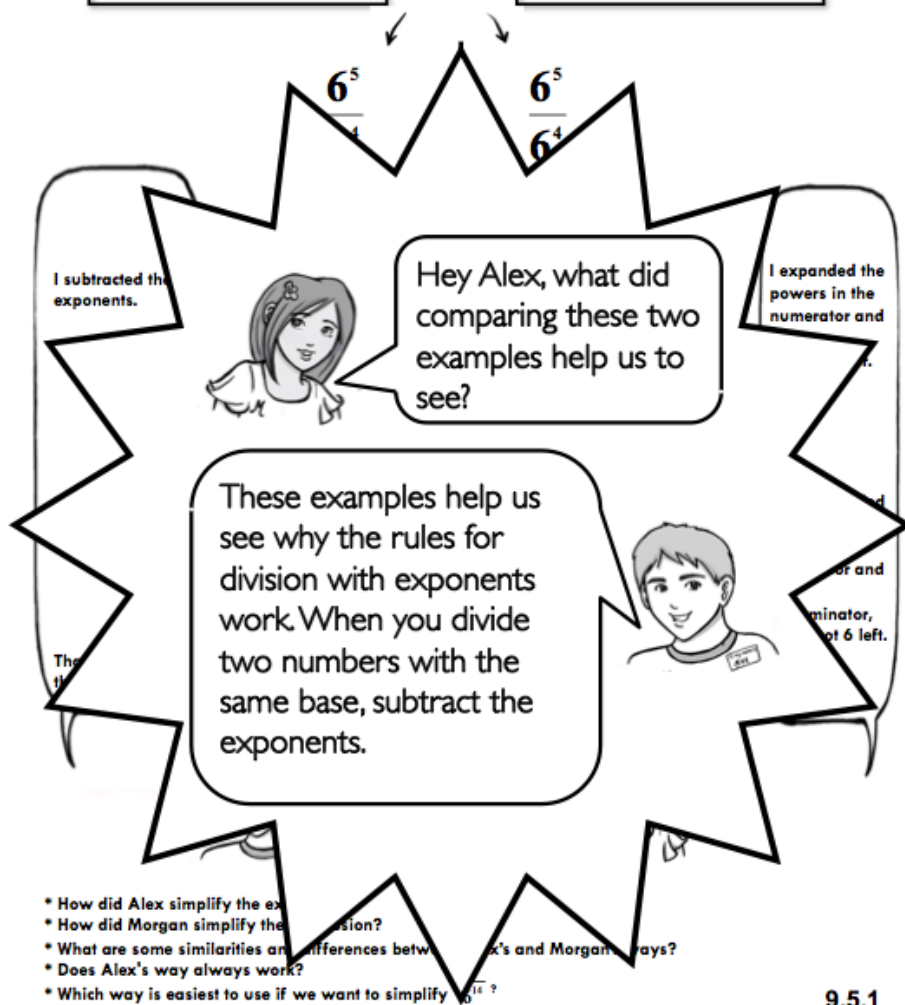
- \* How did Alex simplify the expression?
- \* How did Morgan simplify the expression?
- \* What are some similarities and differences between Alex's and Morgan's ways?
- \* Does Alex's way always work?
- \* Which way is easiest to use if we want to simplify  $\frac{6^{25}}{6^{14}}$ ?

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Alex and Morgan were asked to simplify  $\frac{6^5}{6^4}$

Alex's "subtract the exponents" way

Morgan's "canceling factors" way



3. Rewrite  $5a^{-3}b^{-2}$  with positive exponents.  
Why does the 5 stay in the numerator?

$$5 \cdot a^{-3} \cdot b^{-2} =$$

$$\frac{5}{1} \cdot \frac{1}{a^3} \cdot \frac{1}{b^2} = \boxed{\frac{5}{a^3 b^2}}$$

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

17.  $\frac{1}{2x^{-10}y^{12}}$

$$\frac{x^{10}}{2y^{12}}$$

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

$$\frac{1}{2 \cdot x^{-10} \cdot y^{12}} = \frac{1}{2 \cdot \frac{1}{x^{10}} \cdot y^{12}}$$

$$41. \frac{1}{(2y)^{-5}} = (2y)^5 = 2^5 y^5 = \boxed{32y^5}$$

$$1 \div (2y)^{-5} = 1 \div \frac{1}{(2y)^5} = 1 \cdot \frac{(2y)^5}{1}$$

$a^{-m} = \frac{1}{a^m}$   
 $2^3 = 8$   
 $2^2 = 4$   
 $2^1 = 2$   
 $2^0 = 1$   
 $2^{-1} = \frac{1}{2}$

$$\Rightarrow 2^5 y^5 = \boxed{32y^5}$$

$$19. \ 2^{-4} = \frac{1}{2^4} = \frac{1}{2 \cdot 2 \cdot 2 \cdot 2} = \boxed{\frac{1}{16}}$$

$$21. 4^{-3} \cdot 4^2$$

$$a^m \cdot a^n = a^{m+n}$$

$$4^{-3} \cdot 4^2 = 4^{-3+2}$$

$$= 4^{-1}$$

$$= \boxed{\frac{1}{4}}$$

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

$$4^{-3} \cdot 4^2 =$$

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

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

$$5. \frac{x^5 y^3}{x^5 y^2} = x^0 y^1 = \boxed{y^1} \quad \frac{a^m}{a^n} = a^{m-n}$$

$$\frac{\cancel{x}\cancel{x}\cancel{x}\cancel{x}\cancel{x} \cancel{y}\cancel{y}\cancel{y}}{\cancel{x}\cancel{x}\cancel{x}\cancel{x}\cancel{x} \cancel{y}\cancel{y}} = \boxed{y}$$

$$6. \frac{-2y^7}{14y^5} = -\frac{1}{7} \cdot y^2 = \boxed{-\frac{y^2}{7}}$$

Now for the last 15 minutes  
work on completing page 461 in  
your groups, and we will go  
over questions on Monday