Names (pair) _____ Date _____

Dividing Powers

Example

$2^5 \div 2^3$: write the division as a fraction and cancel equal factors.

$$2^5 \div 2^3 = \frac{\cancel{2} \times \cancel{2} \times \cancel{2} \times 2 \times 2}{\cancel{2} \times \cancel{2} \times \cancel{2}} = 2 \times 2 = 2^2 = 4$$

Three twos in the numerator cancel with the three twos in the denominator. $5 - 3 = 2$ twos are left.

Remember

To divide powers with the same factor, cancel equal factors: $a^m \div a^n = a^{m-n}$ (when $m > n$ and $a \neq 0$). Dividing by 2^3 means dividing by 2 three times.

1 ON YOUR OWN Write as a fraction of factors, cancel, write as one power and work out.

quotient	fraction of factors	one power	value
$3^6 \div 3^2$	_____	☐	☐
$5^4 \div 5^3$	_____	☐	☐
$10^5 \div 10^2$	_____	☐	☐
$2^7 \div 2^4$	_____	☐	☐

2 ON YOUR OWN Write as one power.

$7^8 \div 7^3 =$ ☐ $10^6 \div 10^2 =$ ☐

$a^9 \div a^4 =$ ☐ $x^5 \div x =$ ☐

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3 IN PAIRS **Find the mistake.** Luke wrote: $2^6 \div 2^2 = 2^3$. Ana wrote: $6^5 \div 6^3 = 1^2$. What did each of them do? Write the fraction of factors and correct it.

4 ON YOUR OWN How many times greater is 10^5 than 10^2? Write it as a power of 10 and as a number.

$10^5 \div 10^2 = \square = \square$

5 IN PAIRS **What if everything cancels?** Work out $3^4 \div 3^4$ in two ways: by cancelling factors, and with the rule "subtract the number of factors". What do you conclude?

by cancelling

$$\frac{\textcircled{3} \times \textcircled{3} \times \textcircled{3} \times \textcircled{3}}{\textcircled{3} \times \textcircled{3} \times \textcircled{3} \times \textcircled{3}} = \square$$

with the rule

$3^4 \div 3^4 = 3^{4-4} = \square$

So $3^0 = \square$ Does it also work for $5^2 \div 5^2$?

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Rules mode: choose dividing and watch equal factors in the numerator and denominator cancel.

★ ON YOUR OWN **Exit card.** Write as one power and work out: $5^6 \div 5^4 = \square = \square$