Names (pair) _____ Date _____

Power of a Power, a Product and a Quotient

Example

$(2^3)^2$: the power 2^3 is repeated twice:

$$\underbrace{2 \times 2 \times 2}_{2^3} \times \underbrace{2 \times 2 \times 2}_{2^3} = 2^6$$

$(2 \times 5)^3$: the whole bracket is repeated: $(2 \times 5) \times (2 \times 5) \times (2 \times 5) = 2^3 \times 5^3 = 1{,}000$

Remember

It all follows from the factors: $(a^m)^n = a^{m \times n}$, $(a \times b)^n = a^n \times b^n$ and $(a \div b)^n = a^n \div b^n$.
For a sum it does **not** work: $(a + b)^2 \neq a^2 + b^2$.

1 ON YOUR OWN Write as a product of powers, then as one power.

$(3^2)^3 =$ ☐ $=$ ☐

$(5^4)^2 =$ ☐ $=$ ☐

$(10^3)^2 =$ ☐ $=$ ☐

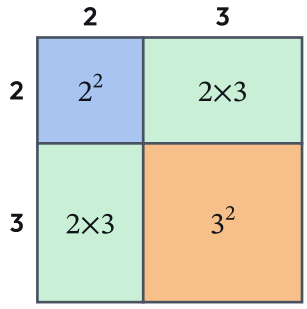
$(x^2)^5 =$ ☐ $=$ ☐

2 IN PAIRS Work out in two ways: the bracket first, then with the rule.

	bracket first	with the rule
$(2 \times 5)^3$	$10^3 =$ ☐	$2^3 \times 5^3 =$ ☐ $\times$ ☐ $=$ ☐
$(6 \div 3)^2$	☐	☐
$(3 \times 4)^2$	☐	☐

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3 IN PAIRS **What about a sum?** Work out $(2+3)^2$ and 2^2+3^2. Are they equal? In the picture of the square with side $2+3$, find what is missing from 2^2+3^2.



$(2+3)^2 =$ ☐

$2^2+3^2 =$ ☐

Missing: ☐

4 IN PAIRS **Find the mistake.** Correct each equation and explain the mistake.

a) $(2^3)^2 = 2^5$ **true** / **false**

Correction: _____

b) $(2\times 3)^2 = 2\times 3^2$ **true** / **false**

Correction: _____

c) $(a+b)^2 = a^2+b^2$ **true** / **false**

Correction: _____

5 ON YOUR OWN All the rules together. Write as one power of 2.

$2^3\times 2^4 =$ ☐ $(2^3)^4 =$ ☐

$2^{12}\div 2^3 =$ ☐ $(2^2)^3\times 2 =$ ☐

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Rules mode: the power of a power, a product and a quotient are shown with factors.

★ ON YOUR OWN **Exit card.** $(3^2)^4 = 3$☐ $(2\times 5)^2 =$ ☐ $(1+2)^2 =$ ☐