

MATHEMATICS: INDICES

Learning Objective: Converting to index form and expanding a power to evaluate.

Converting to index form and expanding a power to evaluate

Powers are used when representing very large or small numbers.

They are used to help write expressions where there is repeated multiplication:

Expanded form \longrightarrow 6 × 6 × 6 × 6 × 6 = 6⁵ \leftarrow Index form

Expression above is written in expanded form and in index form. The 6 is called the **base** and the 5 is called the index or exponent. We read an expression written in index form as 6 to the power of $5:6^5$

The plural of inxed is indices.

Example 1:

Write the following expression in index form:

4 x 4 x 4 x 4 x 4 x 4 x 4

The number 4 is multiplied 6 times

Therefore, $4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4^{6}$

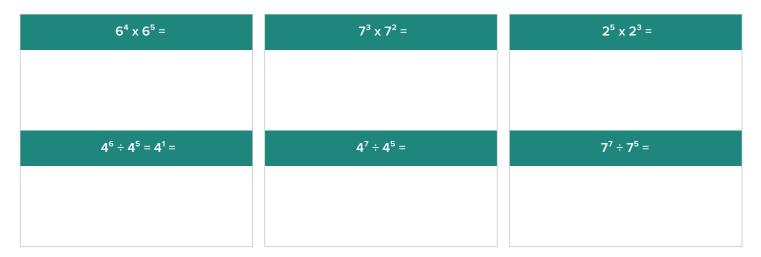
Example 2:

Write the following expression in index form:

2 x 2 x 3 x 3 x 5 x 5 x 5 x 3

Therefore, $2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 5 \times 3 = 2^2 \times 3^3 \times 5^3$

Evaluate the following using the laws for multiplication and division.



Simplify and solve the following questions.

(3 ⁵) ²	(8 ³) ³	(7 ⁴) ²
	(3 ⁵) ²	(3 ⁵) ² (8 ³) ³



MATHEMATICS: ANSWER SHEET

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Expanded form $\rightarrow 6 \times 6 \times 6 \times 6 \times 6 = 6^5$ \leftarrow Index form

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Therefore, $2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 5 \times 3 = 2^2 \times 3^3 \times 5^3$

Evaluate the following using the laws for multiplication and division.

6 ⁴ x 6 ⁵ =	7 ³ x 7 ² =	2 ⁵ x 2 ³ =
6 ⁴ x 6 ⁵ = 6 ⁹	7 ³ x 7 ² = 7 ⁵	$2^5 \times 2^3 = 2^8$
$4^6 \div 4^5 = 4^1 =$	$4^7 \div 4^5 =$	7 ⁷ ÷ 7 ⁵ =
$4^6 \div 4^5 = 4^1 = 4$	$4^7 \div 4^5 = 4^2$	$7^7 \div 7^5 = 7^2$

Simplify and solve the following questions.

(6 ³) ²	(3 ⁵) ²	(8 ³) ³	(7 ⁴) ²
$(6^3)^2 = 6^{(3\times 2)}$	$(3^5)^2 = 3^{(5 \times 2)}$	(8 ³) ³ = 8 ^(3×3)	$(7^4)^2 = 7^{(4 \times 2)}$
= 6^6	= 3^{10}	= 8 ⁹	= 7 ⁸
= 46656	= 59049	= 134217728	= 5764801