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# Supporting Australian Mathematics Project

## Middle Years SAM-MY



## Year 9

### Number and Algebra

#### Indices

Introduction | **Teacher resources** | Student resources

Index laws

#### Content description

Apply index laws to numerical expressions with integer indices (ACMNA209)

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA)

#### Index notation

Powers (or indices) provide a useful way for writing the product of repeated factors.

- A **power** is the product of a certain number of factors, all of which are the same.  
For example,  $2^4 = 2 \times 2 \times 2 \times 2$  is the fourth power of 2.
- The number 2 in  $2^4$  is called the **base**.
- The number 4 in  $2^4$  is called the **index** or **exponent**.
- For any number  $b$ ,  $b^1 = b$ .
- In general,  $b^n = \underbrace{b \times b \times b \times \dots \times b}_n$ , where there are  $n$  factors in the product.  
Here  $b$  is called the base and  $n$  the index.

#### Example 1

$$\begin{array}{l} \mathbf{a} \quad (3 \times 3 \times 3 \times 7 \times 7 \times 7 \times 7 = 3^4 \times 7^4) \\ \mathbf{b} \quad 3 \times 3 \times 3 \times 3 = 3^4 \end{array}$$



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