Craigieburn Secondary College

Best Practice #2

AusVELS 9.0-
Students will be able to I am able to apply the index laws using integer indices to variables and numbers.
Students will be able to extend and apply the index laws to variables, using positive integer indices and the zero index.
Students will be able to apply the index laws to whole numbers

Rule

$a^0 = 1$

Any number, except 0, whose index is 0 is always equal to 1, regardless of the value of the base.

Example

Simplify - 2^0:

$2^0 = 1$

Simplify - $7y^0$

$= 7 \times y^0$

$= 7 \times 1$

$= 7$

Rule

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

A base with a negative index can be re-written over 1 with a positive index

Example

Write 2^{-2} with a positive index and then simplify

$2^{-2} = \frac{1}{2^2}$

$= \frac{1}{4}$

Rule

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

To multiply expressions with the same base, copy the base and add the indices/powers.

Example

a) $m^3 \times m^{12}$

m^{3+12}

m^{15}

b) $5^9 \times 5^7$

$= 5^{9+7}$

$= 5^{16}$

c) $4y^3 \times 6y^7$

4x6 =24

$24y^{3+7}$

$= 24y^{10}$

We multiply 4 x6 because these co-efficient follow number law not index law

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Rule	Example
$a^m \div a^n = a^{m-n}$ **To divide expressions with the same base, copy the base and subtract the indices.**	**a)** $b^{29} \div b^6$ b^{29-6} b^{23} **b)** $5^{15} \div 5^7$ $=5^{15-7}$ $=5^8$ **c)** $45y^8 \div 9y^4$ $45 \div 9 = 5$ $5y^{8-4}$ $=5y^4$ **We divide 45 by 9 because these co-efficient follow number law not index law**
Rule $(a^m)^n = a^{mn}$ **To raise an expression to the index, copy the base and multiply the indices.**	**Example** **a)** $(6^3)^{10}$ 6^{3x10} $=6^{30}$
Rule $(a \times b)^3 = a^3 \times b^3$ **Expanding the brackets – we raise each number/letter to the power outside the bracket.**	**Example** **a)** $(6 \times 5)^2$ $=6^2 \times 5^2$ ----→ **Note answer left in index form** **b)** $(4x)^2$ $=4^2 \times X^2$ $= 16x^2$
Factor Form – expanding the properties	**Example** **a)** $3m^4$ $=3 \times m \times m \times m \times m$ **b)** $5y^3b^2$ $= 5 \times y \times y \times y \times b \times b$

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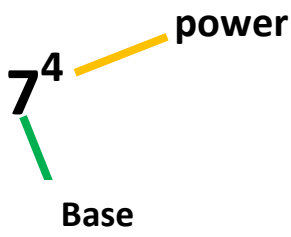
Index Form	Example
	7^4 **means** **7 x 7 x 7 x 7** **The power indicates how many times we multiple the base number by itself.** 7^6 **means** **7 x 7 x 7 x 7 x 7 x7**