6.1 Roots and Radical Expressions

Revien of Exponents

Property	Example
$x^0 = 1$	$4^0 = 1$
$x^a \cdot x^b = x^{a+b}$	$x^2 \cdot x^3 = x^5$
$(x^a)^b = x^{ab}$	$(x^2)^3 = x^6$
$\frac{x^a}{x^b} = x^{a-b}$	$\frac{x^{10}}{x^2} = x^8$
$x^{-a} = \frac{1}{x^a}$	$x^{-4} = \frac{1}{x^4}$

Ex $\dfrac{(2x^{-2}y^3z^0)^{-3}}{2x^2y} = \dfrac{2^{-3}x^6y^{-9}z^0}{2x^2y}$

$= \dfrac{x^4(1)}{2^3 \cdot 2\, y y^9} = \dfrac{x^4}{16y^{10}}$

nth Root of b

$\sqrt[n]{b} = a$ if $a^n = b$

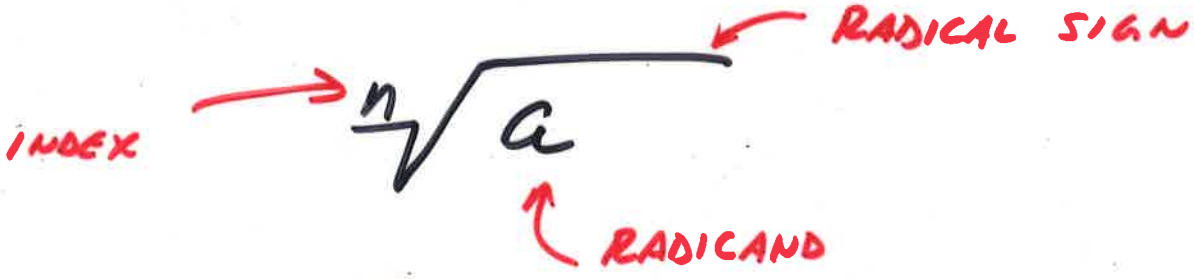
Ex: $\sqrt[3]{8} = 2$ since $2^3 = 8$

$\sqrt[3]{-8} = -2$ since $(-2)^3 = -8$

$\sqrt[4]{81} = 3$ since $3^4 = 81$

$\sqrt[4]{-81}$ = NO REAL NUMBER since $x^4 \neq -81$

$\sqrt[3]{.008} = 0.2$ since $0.2^3 = .008$



NOTE $\sqrt{4} = 2$ since $2^2 = 4$

$\sqrt{4} = -2$ since $(-2)^2 = 4$

USE PRINCIPAL SQUARE ROOT $\sqrt{4} = 2$

NOTE: $\sqrt{x^2} = |x|$

$\sqrt[n]{a^n} = |a|$ WHEN n EVEN

$\sqrt[n]{a^n} = a$ WHEN n ODD

Ex: $\sqrt{16x^{10}} = 4|x^5|$

$\sqrt{16x^{16}} = 4x^8$

$\sqrt[4]{x^8y^4} = x^2|y|$

$\sqrt{9x^2y^4} = 3|x|y^2$

$\sqrt[3]{-27x^{12}} = -3x^4$

$\sqrt[3]{-27x^{15}} = -3x^5$

$\sqrt{(x-4)^2} = |x-4|$