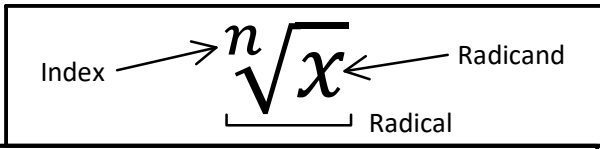


C11 - 5.0 - Radicals Review



Simplifying Radicals

$\sqrt{2^2} = 2$ ✓	$\sqrt{x^2} = x $ OR $= x ; x \geq 0$	$\sqrt[3]{2^3} = 2$ ✓	$\sqrt[3]{x^3} = x$
$\sqrt{2^3} = 2\sqrt{2} = 2^{\frac{3}{2}}$	$\sqrt{x^3} = x\sqrt{x} ; x \geq 0$	$\sqrt[3]{2^4} = 2\sqrt[3]{2} = 2^{\frac{4}{3}}$	$\sqrt[3]{x^4} = x\sqrt[3]{x} = x^{\frac{4}{3}}$
$\sqrt{2^4} = 2^2 = 4$	$\sqrt{x^4} = x^2$	$\sqrt[3]{2^5} = 2\sqrt[3]{2^2} = 2^{\frac{5}{3}}$	$\sqrt[3]{x^5} = x\sqrt[3]{x^2} = x^{\frac{5}{3}}$
$\sqrt{2^5} = 2^2\sqrt{2} = 2^{\frac{5}{2}}$	$\sqrt{x^5} = x^2\sqrt{x} ; x \geq 0$	$\sqrt[3]{2^6} = 2^2 = 4$	$\sqrt[3]{x^6} = x^2$
	$\sqrt{x^6} = x^3 $ OR $= x^3 ; x \geq 0$	$\sqrt[3]{2^7} = 2^2\sqrt[3]{2} = 2^{\frac{7}{3}}$	$\sqrt[3]{x^7} = x^2\sqrt[3]{x} = x^{\frac{7}{3}}$

Adding and Subtracting Radicals:
 Can only add or subtract Like Radicals:
 Same Index, Same Radicand.

$$x\sqrt{a} + y\sqrt{a} = (x + y)\sqrt{a}$$

$$2\sqrt{3} + 4\sqrt{3} = (2 + 4)\sqrt{3} = 6\sqrt{3} \quad 7.93 = 7.93 \quad \checkmark$$

Multiplying and Dividing Radicals:
 Can only multiply/divide like indexes.
 Cannot multiply/divide unlike indexes.
 OR Change Form, Add/Subtract Exponents

$$3\sqrt[3]{7} \times 2\sqrt[3]{3} = 6\sqrt[3]{21}$$

$$27.5 = 27.5 \quad \checkmark$$

$$\frac{10\sqrt[3]{6}}{2\sqrt[3]{3}} = \frac{10}{2} \sqrt[3]{\frac{6}{3}} = 5\sqrt[3]{2}$$

$$7.07 = 7.07 \quad \checkmark$$

Rationalizing the Denominator

$\frac{2}{\sqrt{7}} = 0.756$	$\frac{a}{\sqrt{a}} = \sqrt{a}$	$\frac{\sqrt{a}}{a} = \frac{1}{\sqrt{a}}$
$\frac{2}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{2\sqrt{7}}{7} = 0.756$ ✓	$\frac{2}{\sqrt{2}} = \sqrt{2}$ 1.41 = 1.41	$\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$ 0.707 = 0.707

Conjugates

$$\frac{2}{4 - \sqrt{3}} = 0.88$$

$$\frac{2}{4 - \sqrt{3}} \times \frac{4 + \sqrt{3}}{4 + \sqrt{3}} = \frac{2(4 + \sqrt{3})}{16 - 3} = \frac{8 + 2\sqrt{3}}{13} = 0.88 \quad \checkmark$$

$$(a + b)(a - b) = a^2 - ab + ab - b^2 = a^2 - b^2$$

$$(4 - \sqrt{3})(4 + \sqrt{3}) = 16 - 4\sqrt{3} + 4\sqrt{3} - 3 = 16 - 3 = 13 \quad \checkmark$$

Equations

$\sqrt{x+3} - x = +1$ $\sqrt{x+3} = x + 1$ $(\sqrt{x+3})^2 = (x+1)^2$ $x+3 = (x+1)(x+1)$ $x+3 = x^2 + 2x + 1$ $0 = x^2 + x - 2$ $0 = (x+2)(x-1)$	$x + 2 = 0$ $x = -2$	$x - 1 = 0$ $x = 1$	Restrictions: Set underneath root ≥ 0 and solve $x + 3 \geq 0$ $x \geq -3$
	$\sqrt{x+3} = x+1$ $\sqrt{-2+3} = -2+1$ $1 \neq -1 \quad \times$	$\sqrt{x+3} = x+1$ $\sqrt{1+3} = 1+1$ $2 = 2 \quad \checkmark$	

Domain

$\sqrt[4]{x^{12}} = x^{\frac{12}{4}} = x^3 $ OR $= x^3 ; x \geq 0$	$\sqrt[3]{x}; x \in \mathbb{R}$	Basically : Substitute a +ve # and -ve # into the question and answer to check if absolute values or restrictions (if not given) are needed!
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