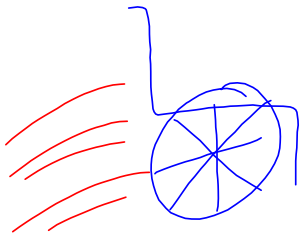
Radicals

Hot wheel^2 chairs



$\sqrt[2]{x}$

$\sqrt{25} = 5$

$\sqrt[3]{27} = 3$

Multiplying Radicals

When multiplying radicals, we multiply the whole parts together, and the radicands together

"outside"

"inside"

$3(2\sqrt{3})$

$= 6\sqrt{3}$

$2\sqrt{5} \times 3\sqrt{2}$

$= 6\sqrt{10}$

$(2+\sqrt{3})(2-\sqrt{3})$

$= 4 - 2\sqrt{3} + 2\sqrt{3} - \sqrt{9}$

$= 4 - 3$

$= 1$

$(x+2)(x+5)$

$= x^2 + 5x + 2x + 10$

$= x^2 + 7x + 10$

Simplifying Radicals

$\sqrt{5} \times \sqrt{9} = \sqrt{45}$

* Factor out a square number if possible. *

$\sqrt{50}$

$= \sqrt{25} \times \sqrt{2}$

$= 5\sqrt{2}$

$\sqrt{27}$

$= \sqrt{9} \times \sqrt{3}$

$= 3\sqrt{3}$

Adding and Subtracting Radicals

In order to add or subtracts radicals, the radicands must be the same. Then + or − the whole parts.

$\sqrt{7}+5\sqrt{7}-3\sqrt{7}$

$= 6\sqrt{7}-3\sqrt{7}$

$= 3\sqrt{7}$

$4\sqrt{2}+2\sqrt{8}$

$= 4\sqrt{2}+2\sqrt{4}\sqrt{2}$ ($2\times2\times\sqrt{2}$)

$= 4\sqrt{2}+4\sqrt{2}$

$= 8\sqrt{2}$

$7\sqrt{98} \rightarrow 7\sqrt{49 \times 2}$

$= 7\sqrt{49}\sqrt{2}$

$= 49\sqrt{2}$

Simplify the following:

$$\frac{\sqrt{147}}{\sqrt{98}}$$

$$= \frac{\sqrt{49}\sqrt{3}}{\sqrt{49}\sqrt{2}}$$

$$= \frac{7\sqrt{3}}{7\sqrt{2}}$$

$$= \frac{\sqrt{3}}{\sqrt{2}}$$

$$= \sqrt{\frac{3}{2}}$$

$$1\sqrt{5}(-3\sqrt{7})$$

$$= -3\sqrt{35}$$

$$5\sqrt{3} - \sqrt{72} + \sqrt{243} + \sqrt{8}$$

$$= 5\sqrt{3} - 6\sqrt{2} + \sqrt{81}\sqrt{3} + \sqrt{4}\sqrt{2}$$

$$= 5\sqrt{3} - 6\sqrt{2} + 9\sqrt{3} + 2\sqrt{2}$$

$$= 14\sqrt{3} - 4\sqrt{2}$$

$\sqrt{72} \rightarrow \sqrt{36}\sqrt{2}$

$= \sqrt{4}\sqrt{18} \qquad 6\sqrt{2}$

$= 2\sqrt{18}$

$= 2\sqrt{9}\sqrt{2}$

$= 6\sqrt{2}$

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(a, c, e)