Radicals - Rules

1. No perfect n^{th} power under a radical

$\sqrt{8} = \sqrt{2^3} = 2\sqrt{2}$

$\sqrt{x^3} = x\sqrt{x}$

2. No fraction under a radical sign $\sqrt{\frac{1}{3}}, \sqrt{\frac{x}{y}}$

3. No radical in the den.

$\frac{1}{\sqrt{3}}$ $\frac{2}{\sqrt{5}}$

$\frac{1}{\sqrt{3}+1}$

$\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{\sqrt{2}}{2}$

$\frac{3}{6} = \frac{1 \cdot 3}{2 \cdot 3}$

$\frac{3}{5} \cdot \frac{2}{1}$

$\sqrt{4} = 2$

$\sqrt{2^2} = 2$

$\sqrt{49} = 7$

$\frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$\frac{3\sqrt{5}}{5}$

$3 \cdot \sqrt{5}$

$\sqrt{7^2} = 7$

$\sqrt{11^2} = 11$

$\frac{2\sqrt{3}}{5\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}}$

$\frac{2\sqrt{21}}{5 \cdot 7}$

$\sqrt{2} \cdot \sqrt{2} = \sqrt{2^2} = 2$

$\sqrt{11} \cdot \sqrt{11} = \sqrt{11^2} = 11$

(radical x itself = the radicand)

$\sqrt{123} \cdot \sqrt{123} =$

$\sqrt{x^7} \cdot \sqrt{x^7} = x^7$

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$$\frac{6}{5\sqrt{12}} \qquad 12 = 2^2 \cdot 3$$

$$\frac{6}{5\sqrt{2^2 \cdot 3}}$$

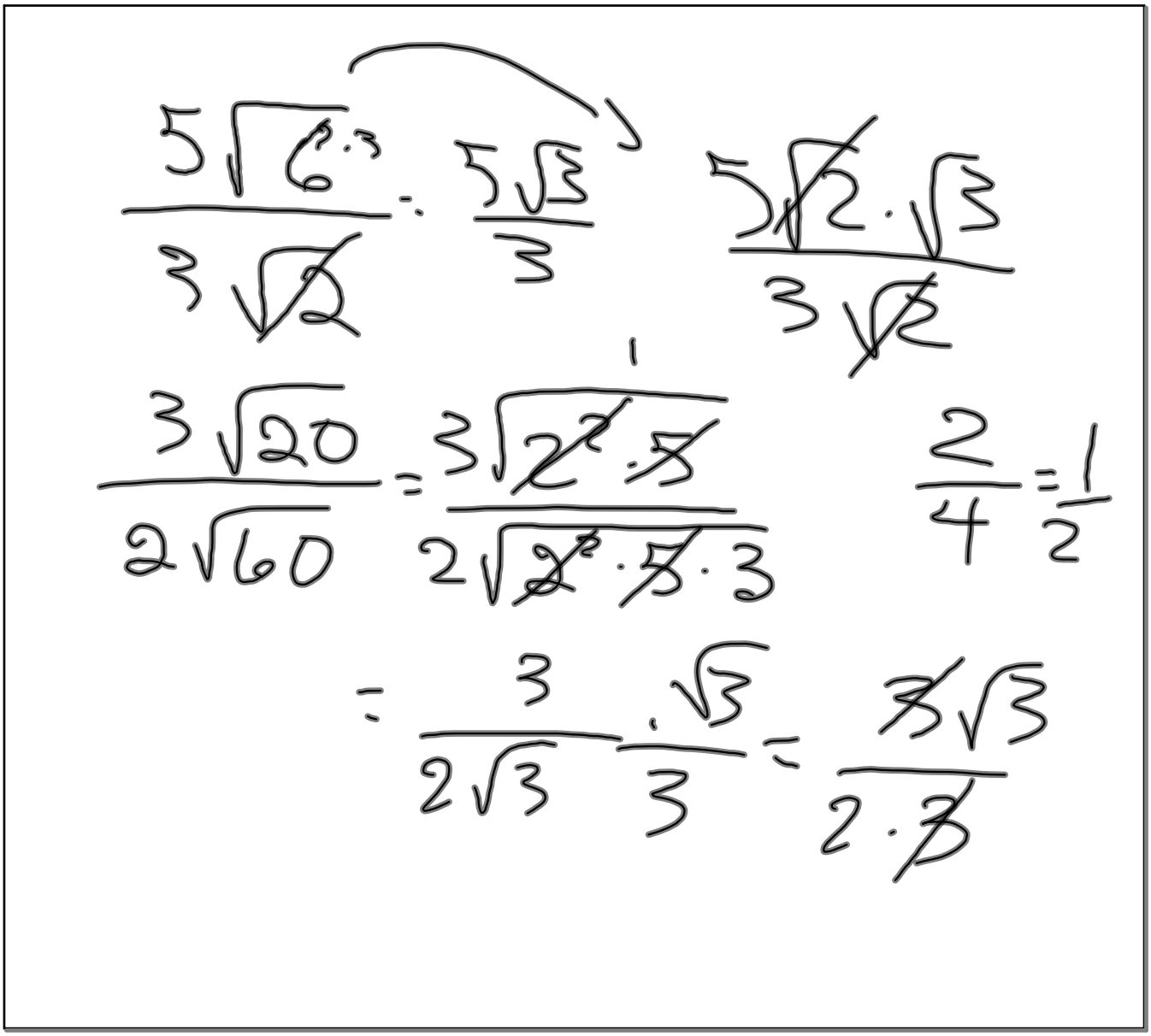
$$\frac{6}{5 \cdot 2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

$$\frac{6\sqrt{3}}{5 \cdot 2 \cdot 3} = \frac{\sqrt{3}}{5}$$

$$\frac{6}{5\sqrt{12}} \cdot \frac{\sqrt{12}}{\sqrt{12}}$$

$$\frac{6\sqrt{12^{2^7 \cdot 3}}}{5 \cdot 12}$$

$$\frac{6 \cdot 2 \cdot \sqrt{3}}{5 \cdot 12} \qquad 2^7 \cdot 3$$



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$$\frac{1}{(\sqrt{3}+1)} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3+\sqrt{3}}$$

$$\frac{1}{(\sqrt{3}+1)} \frac{(\sqrt{3}+1)}{(\sqrt{3}+1)} = \frac{\sqrt{3}+1}{4+2\sqrt{3}}$$

$$\sqrt{3}(\sqrt{3}+1)+1(\sqrt{3}+1)$$

$$3+\sqrt{3}+\sqrt{3}+1$$

$$4+2\sqrt{3}$$

$$\frac{1}{(\sqrt{3}+1)} \frac{(\sqrt{3}-1)}{(\sqrt{3}-1)} = \frac{\sqrt{3}-1}{2}$$

$$\sqrt{3}(\sqrt{3}-1)+1(\sqrt{3}-1)$$

$$3-\sqrt{3}+\sqrt{3}-1$$

$$2$$

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$(x+2)(x-2) = x^2 - 4$

Conjugate

No middle term if multiplied

To multiply

1. 1ST x 1ST
2. Last x Last

always separated by a minus

$(x+2)^2$

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

$x^2 + 4x + 4$

$(x-2)(x-2)$

$x^2 - 4x + 4$

$(x-2)^2$

$(3x-7)(3x+7) = 9x^2 - 49$

$(\sqrt{5}+2)(\sqrt{5}-2) = 5 - 4 = 1$

$(3\sqrt{2}+\sqrt{5})(3\sqrt{2}-\sqrt{5}) = 18 - 5$

$= 13$

$(5\sqrt{11}+\sqrt{13})(5\sqrt{11}-\sqrt{13})$

$275 - 13$

262

$\frac{25}{11}$

$\frac{25}{25}$

$\frac{25}{275}$

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$$\frac{(3\sqrt{5}-7)}{(6\sqrt{2}+\sqrt{3})}\cdot\frac{(6\sqrt{2}-\sqrt{3})}{(6\sqrt{2}-\sqrt{3})}$$

$$72-3$$

$$69$$

$$3\sqrt{5}(6\sqrt{2}-\sqrt{3})-7(6\sqrt{2}-\sqrt{3})$$

$$18\sqrt{10}-3\sqrt{15}-42\sqrt{2}+7\sqrt{3}$$

$$\sqrt{\frac{3}{5}} = \frac{\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{15}}{5}$$

$$\sqrt{\frac{x}{y}} = \frac{\sqrt{x}}{\sqrt{y}} \cdot \frac{\sqrt{y}}{\sqrt{y}} = \frac{\sqrt{xy}}{y}$$

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