Simplifying RADICALS!!!!

Ex 1. $\sqrt{32}-\sqrt{24}+8\sqrt{2}-\sqrt{54}$

$= \sqrt{16\cdot 2} - \sqrt{4\cdot 6} + 8\sqrt{2} - \sqrt{9\cdot 6}$

$= 4\sqrt{2} - 2\sqrt{6} + 8\sqrt{2} - 3\sqrt{6}$

$= \boxed{12\sqrt{2} - 5\sqrt{6}}$

*Ex.*2 $\sqrt[3]{16}+\sqrt[3]{24}$

You need to recall your perfect cubes!
1, 8, 27, 64, 125, 216, 343, 512, 729, 1000,etc.

$\sqrt[3]{8\cdot 2} + \sqrt[3]{8\cdot 3}$

$\boxed{2\sqrt[3]{2} + 2\sqrt[3]{3}}$

Ex. 3 $3\sqrt[3]{250}-5\sqrt[3]{54}$

$= 3\cdot\sqrt[3]{125}\cdot\sqrt[3]{2} - 5\sqrt[3]{27}\cdot\sqrt[3]{2}$

$= 3\cdot 5\sqrt[3]{2} - 5\cdot 3\sqrt[3]{2}$

$= 15\sqrt[3]{2} - 15\sqrt[3]{2}$

$= \boxed{0}$

Ex. 4 $\sqrt{\dfrac{3}{4}} = \dfrac{\sqrt{3}}{\sqrt{4}} = \boxed{\dfrac{\sqrt{3}}{2}}$

Ex. 5 $\sqrt[3]{\dfrac{3}{4}} = \dfrac{\sqrt[3]{3}}{\sqrt[3]{4}}\cdot\dfrac{\sqrt[3]{2}}{\sqrt[3]{2}} = \dfrac{\sqrt[3]{6}}{\sqrt[3]{\underset{2^3}{8}}} = \boxed{\dfrac{\sqrt[3]{6}}{2}}$

to rationalize you need cube

Ex. 6 $\sqrt[4]{\dfrac{3}{4}} = \dfrac{\sqrt[4]{3}}{\sqrt[4]{4}} = \dfrac{\sqrt[4]{3}}{\sqrt[4]{2^2}}\cdot\dfrac{\sqrt[4]{2^2}}{\sqrt[4]{2^2}} = \dfrac{\sqrt[4]{12}}{\sqrt[4]{2^4}} = \boxed{\dfrac{\sqrt[4]{12}}{2}}$

Ex. 7 $\sqrt[5]{\dfrac{3}{4}} = \dfrac{\sqrt[5]{3}}{\sqrt[5]{2^2}}\cdot\dfrac{\sqrt[5]{2^3}}{\sqrt[5]{2^3}} = \dfrac{\sqrt[5]{24}}{\sqrt[5]{2^5}} = \boxed{\dfrac{\sqrt[5]{24}}{2}}$

Ex. 8 $\left(3\sqrt{2}+5\right)\left(\sqrt{6}-3\right)$ $= \boxed{6\sqrt{3}+5\sqrt{6}-9\sqrt{2}-15}$

	$\sqrt{6}$	-3
$3\sqrt{2}$	$3\sqrt{12}$ $3\sqrt{4\cdot 3}$ $3\cdot 2\sqrt{3}$ $6\sqrt{3}$	$-9\sqrt{2}$
$+5$	$5\sqrt{6}$	-15

Ex. 9 $\left(4\sqrt{3}-2\right)^2$

	$4\sqrt{3}$	-2
$4\sqrt{3}$	$16\sqrt{9}$ $16\cdot 3$ 48	$-8\sqrt{3}$
-2	$-8\sqrt{3}$	$+4$

$= \boxed{52-16\sqrt{3}}$

Ex 10. $\dfrac{\sqrt{3}+2}{\sqrt{3}-1}$

This is a binomial....you must multiply top and bottom by the CONJUGATE

$$\frac{\sqrt{3}+2}{\sqrt{3}-1}\cdot\frac{\sqrt{3}+1}{\sqrt{3}+1}$$

$$=\frac{\sqrt{9}+\sqrt{3}+2\sqrt{3}+2}{\sqrt{9}+\cancel{\sqrt{3}-\sqrt{3}}-1}$$

$$=\frac{3+3\sqrt{3}+2}{3-1}=\frac{5+3\sqrt{3}}{2}\text{ or }\boxed{\frac{5}{2}+\frac{3}{2}\sqrt{3}}$$