Sec 8.5 cont.

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

Remember

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

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

$$= 1 - 2 \quad \leftarrow \text{NO more SQ ROOT!}$$

$$= -1$$

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

$$= \frac{3-3\sqrt{2}}{1-2}$$

$$= \frac{3-3\sqrt{2}}{-1}$$

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

$$= \boxed{-3+3\sqrt{2}}$$

"multiplying by the Conjugate"

Conjugate pair $(x+y)(x-y)$

$2-\sqrt{5}$ conjugate pair $\rightarrow$ $2+\sqrt{5}$

$x+3$ conjugate $\rightarrow$ $x-3$

96 $\dfrac{(\sqrt{a}+\sqrt{b})(\sqrt{a}+\sqrt{b})}{(\sqrt{a}-\sqrt{b})(\sqrt{a}+\sqrt{b})}$ conjugate of $\sqrt{a}-\sqrt{b}$ is $\sqrt{a}+\sqrt{b}$

$$\frac{\sqrt{a}\sqrt{a}+\sqrt{a}\sqrt{b}+\sqrt{a}\sqrt{b}+\sqrt{b}\sqrt{b}}{\sqrt{a}\cdot\sqrt{a}+\sqrt{a}\cdot\sqrt{b}-\sqrt{a}\sqrt{b}-\sqrt{b}\sqrt{b}}$$

$$\frac{a+\sqrt{ab}+\sqrt{ab}+b}{a+\sqrt{ab}-\sqrt{ab}-b}$$

$$\boxed{\frac{a+2\sqrt{ab}+b}{a-b}}$$

Ex: $\dfrac{15-6\sqrt{2}}{18} = \dfrac{3(5-2\sqrt{2})}{18\ 6}$

$$\boxed{\frac{5-2\sqrt{2}}{6}}$$

Simplify

$$\sqrt{50} - \sqrt{98} + \sqrt{72}$$

$$4\sqrt{2}$$

$$\frac{6\sqrt[4]{3\cdot3\cdot3}}{\sqrt[4]{3}\cdot\sqrt[4]{3\cdot3\cdot3}} \quad 2\sqrt[4]{3\cdot3\cdot3}$$

$$\frac{6\sqrt[4]{27}}{\sqrt[4]{3\cdot3\cdot3\cdot3}} = \frac{2\,6\sqrt[4]{27}}{3} = 2\sqrt[4]{27}$$

$$\boxed{\frac{7\cdot\sqrt{2}}{\sqrt{2}\cdot\sqrt{2}} = \frac{7\sqrt{2}}{2}}$$

$$\boxed{\frac{7\cdot\sqrt[4]{2\cdot2\cdot2}}{\sqrt[4]{2}\cdot\sqrt[4]{2\cdot2\cdot2}} = \frac{7\sqrt[4]{8}}{2}}$$

$$\frac{7\cdot\sqrt[3]{2\cdot2}}{\sqrt[3]{2}\cdot\sqrt[3]{2\cdot2}} = \frac{7\sqrt[3]{4}}{2}$$

$$\frac{7}{\sqrt[3]{4}} = \frac{7\cdot\sqrt[3]{2}}{\sqrt[3]{2\cdot2}\cdot\sqrt[3]{2}} = \frac{7\sqrt[3]{2}}{2}$$

$$\frac{15}{\sqrt[3]{9}} = 5\sqrt[3]{3}$$

$$\frac{15 \cdot \sqrt[3]{3}}{\sqrt[3]{3 \cdot 3} \cdot \sqrt[3]{3}}$$

$$\frac{5 \cancel{15} \sqrt[3]{3}}{\cancel{3}\ 1}$$

$$5\sqrt[3]{3}$$

$$\frac{15}{\sqrt[3]{9} \cdot \sqrt[3]{9 \cdot 9}}$$

$$\frac{5\ 15\sqrt[3]{81}}{\cancel{9}\ 3}$$

$$\frac{5\sqrt[3]{81}}{3}$$

81
9 9
3 3 3 3

$$\frac{5 \cdot \cancel{3}\sqrt[3]{3}}{\cancel{3}}$$

$$5\sqrt[3]{3}$$

$$\frac{16\sqrt{3}}{5\sqrt{12}} = \frac{8}{5}$$

12
2 6
2 3

option1
$$\frac{16\sqrt{3} \cdot \sqrt{3}}{5 \cdot 2\sqrt{3} \cdot \sqrt{3}}$$

$$\frac{16 \cdot 3}{5 \cdot 2 \cdot 3} = \frac{\cancel{48}}{30} = \frac{24}{\cancel{15}} = \boxed{\frac{8}{5}}$$

option2
$$\frac{\cancel{16}^{8}\cancel{\sqrt{3}}}{5 \cdot \cancel{2}\cancel{\sqrt{3}}} = \frac{8}{5}$$