Check-up...

Simplify each of the following...

$3\sqrt{12}\left(5\sqrt{20}\right)$

$\left(3\sqrt{6}\right)^2 - \left(4 - 3\sqrt{8}\right)^2$

$3\sqrt[3]{8}\left(6\sqrt[3]{5} + \sqrt[3]{8}\right)$

$\frac{8}{\sqrt{18}}$

$\frac{6\sqrt{24}}{9\sqrt{50}}$

$\frac{2x\sqrt{10x^8}}{9x^2\sqrt{8x}}$

$\frac{7\sqrt{5}}{\sqrt[3]{40}}$

$3\sqrt{12}\left(5\sqrt{20}\right)$

$(6\sqrt{3})(10\sqrt{5})$

$= 60\sqrt{15}$

$\left(3\sqrt{6}\right)^2 - \left(4 - 3\sqrt{8}\right)^2$

$= [9(6)] - (16 - 24\sqrt{8} + 72)$

$= 54 - 16 + 24\sqrt{8} - 72$

$= \underline{-34 + 48\sqrt{2}}$

$3\sqrt[3]{8}\left(6\sqrt[3]{5}+\sqrt[3]{8}\right)$

$18\sqrt[3]{40}+3\sqrt[3]{64}$

$=18\sqrt[3]{8\times 5}+3(4)$

$=36\sqrt[3]{5}+12$

$\frac{8}{\sqrt{18}}\left(\frac{\sqrt{18}}{\sqrt{18}}\right)$

$\frac{8\sqrt{18}}{18}$

$\frac{24\sqrt{2}}{18}$

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

$\frac{6\sqrt{24}}{9\sqrt{50}}$

$\sqrt{16 \cdot 5 x^8 x^1}$

$\frac{2x\sqrt{10x^8}}{9x^2\sqrt{8x}}\left(\frac{\sqrt{8x}}{\sqrt{8x}}\right)$

$\frac{6(2\sqrt{6})}{9(5\sqrt{2})}$

$=\frac{2x\sqrt{80x^9}}{9x^2(8x)}$

$\frac{12\sqrt{6}}{45\sqrt{2}}$

$=\frac{2x(4x^4\sqrt{5x})}{72x^3}$

$\frac{12}{45}\sqrt{3}$

$=\frac{8x^5\sqrt{5x}}{72x^3}$

$\frac{4\sqrt{3}}{15}$

$=\frac{1}{9}x^2\sqrt{5x}$

$$\frac{7\sqrt{5}}{\sqrt[3]{40}} \left(\frac{\sqrt[3]{40}}{\sqrt[3]{40}}\right)^2$$

$$\frac{7\sqrt{5}\left(\sqrt[3]{40}\right)^2}{40}$$

$$\frac{7\sqrt{5}\left(2\sqrt[3]{5}\right)^2}{40}$$

$$\frac{28\sqrt{5}\left(\sqrt[3]{5}\right)^2}{40}$$

$$\frac{7\sqrt{5}\left(\sqrt[3]{5}\right)^2}{10}$$

$$=\frac{7\sqrt{5}\sqrt[3]{25}}{10}$$

What about binomial denominators??

$$\frac{\sqrt{6}}{5-\sqrt{2}} = ??$$

Conjugates

$a-7 \Rightarrow a+7$

$\sqrt{3}+4 \Rightarrow \sqrt{3}-4$

$-\sqrt{6}-\sqrt{2} \Rightarrow \sqrt{6}+\sqrt{2}$

Many rational quotients have a sum or difference of terms in a denominator, rather than a single radical.

In that case, we need to multiply by the ***conjugate*** of the numerator or denominator (which ever one we are rationalizing).

The conjugate uses the same terms, but the opposite operation (+ or –).

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

Examples of conjugates...

$(5-2\sqrt{3}) \to (5+2\sqrt{3}) = 25 \cancel{+10\sqrt{3}} \cancel{-10\sqrt{3}} - 4(3) = 13$

$-8\sqrt{7}+2 \to -8\sqrt{7}-2$

$-\sqrt{12}-6\sqrt{3} \to -\sqrt{12}+6\sqrt{3}$

$$\frac{\sqrt{6}}{5-\sqrt{2}}\left(\frac{5+\sqrt{2}}{5+\sqrt{2}}\right)$$

Binomial

Conjugate of denominator

$$=\frac{5\sqrt{6}+\sqrt{12}}{25-2}$$

$$=\frac{5\sqrt{6}+2\sqrt{3}}{23}$$

$$\frac{3-4\sqrt{2}}{2\sqrt{3}+3\sqrt{6}}\left(\frac{2\sqrt{3}-3\sqrt{6}}{2\sqrt{3}-3\sqrt{6}}\right)$$

$$=\frac{6\sqrt{3}-9\sqrt{6}-8\sqrt{6}+12\sqrt{12}}{12-54}$$

$$=\frac{6\sqrt{3}-17\sqrt{6}+24\sqrt{3}}{-42}$$

$$=\frac{30\sqrt{3}-17\sqrt{6}}{-42}$$

$$-\frac{2}{3}$$

$$\frac{-(30\sqrt{3}-17\sqrt{6})}{42}$$

$$=\frac{17\sqrt{6}-30\sqrt{3}}{42}$$

8 c) $-\frac{2}{3}\sqrt{\frac{5}{12u}}$, $u > 0$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

$$-\frac{2}{3}\left(\frac{\sqrt{5}}{\sqrt{12u}}\right)$$

$$= -\frac{2\sqrt{5}}{3\sqrt{12u}}\left(\frac{\sqrt{12u}}{\sqrt{12u}}\right)$$

$$= -\frac{2\sqrt{60u}}{36u}$$

$$= -\frac{4\sqrt{15u}}{36u}$$

$$= -\frac{1}{9u}\sqrt{15u}$$

Homework...

Page 290
#9, 10, 11, 12, 13, 14, 17, 23

$$\frac{(2\sqrt{3}+5)}{(\sqrt{3}-2)(\sqrt{6}+8)}\cdot\frac{(\sqrt{3}+2)(\sqrt{6}-8)}{(\sqrt{3}+2)(\sqrt{6}-8)}$$

#11/

$\frac{3r}{\sqrt{2}r-8}$, what values of "r" give real numbers

$\sqrt{2}r-8\neq 0$

$\sqrt{2}r\neq 8$

$r\neq\frac{8}{\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right)\neq\frac{8\sqrt{2}}{2}$

$\neq 4\sqrt{2}$

Attachments

Worksheet - DeMoivres Theorem.doc