Add & Subtract:

$$3\sqrt{20} + 2\sqrt{10} - 3\sqrt{45}$$

$$3\left(\sqrt{4 \times 5}\right) + 2\sqrt{10} - 3\left(\sqrt{9 \times 5}\right)$$

$$3\left(2\sqrt{5}\right) + 2\sqrt{10} - 3\left(3\sqrt{5}\right)$$

$$6\sqrt{5} + 2\sqrt{10} - 9\sqrt{5}$$

$$= -3\sqrt{5} + 2\sqrt{10}$$

ex.

$$\frac{3 + 7\sqrt{2}}{10\sqrt{2}} \Rightarrow 3 + 7 \times \sqrt{2}$$

Multiplication

$$(2\sqrt{6})(5\sqrt{2})$$
$$= 10\sqrt{12}$$
$$= 10(2\sqrt{3})$$
$$\boxed{= 20\sqrt{3}}$$

$$\sqrt{a} \cdot \sqrt{b} = \sqrt{a \times b}$$

ex.

$$3\sqrt{5}(6 - 4\sqrt{20})$$
$$= 18\sqrt{5} - 12\sqrt{100}$$
$$= 18\sqrt{5} - 12(10)$$
$$= 18\sqrt{5} - 120$$

Distributive Property

$$a(b+c)$$
$$= ab + ac$$

ex.

$$2(x+7)$$
$$= 2x + 14$$

- Division

Quotient Rule of Radicals: $\dfrac{a \sqrt[m]{b}}{c \sqrt[m]{d}} = \dfrac{a}{c} \sqrt[m]{\dfrac{b}{d}}$

$\dfrac{\sqrt{28}}{\sqrt{7}} = \sqrt{\dfrac{28}{7}}$

$= \sqrt{4}$

$= 2$

$\dfrac{12\sqrt{48}}{-3\sqrt{8}} = -4\sqrt{\dfrac{48}{8}}$

$= -4\sqrt{6}$

$\dfrac{15\sqrt[3]{108}}{20\sqrt[3]{2}}$

$= \dfrac{15\sqrt[3]{27 \times 4}}{20\sqrt[3]{2}}$

$= \dfrac{45\sqrt[3]{4}}{20\sqrt[3]{2}}$

$= \dfrac{9}{4}\sqrt[3]{2}$

$= \dfrac{3}{4}\sqrt[3]{54}$

$= \dfrac{3}{4}\left(\sqrt[3]{27 \times 2}\right)$

$= \dfrac{3}{4}\left(\dfrac{3}{1}\sqrt[3]{2}\right)$

$= \dfrac{9}{4}\sqrt[3]{2}$

What if the radicals do not divide evenly?? $\dfrac{\sqrt{8}}{\sqrt{3}}$ Now What??

- **Rationalize the Denominator...** $\left(\begin{array}{l}\text{Eliminate}\\\text{Radicals}\\\text{from}\\\text{Denominator!!}\end{array}\right)$

(I) Monomial Denominator

$$\dfrac{\sqrt{8}}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} \qquad \begin{array}{l}\text{Radical}\\\text{from}\\\text{denominator}\end{array}$$

$$= \dfrac{\sqrt{24}}{3} \qquad \text{Equal to "1"}$$

$$= \dfrac{2\sqrt{6}}{3} \quad \text{No Radical!!!}$$

4

$$\frac{4\sqrt{3}}{\sqrt{15}}\left(\frac{\sqrt{15}}{\sqrt{15}}\right)$$

$$= \frac{4\sqrt{45}}{15}$$

$$= \frac{4(3\sqrt{5})}{15}$$

$$= \frac{12\sqrt{5}}{15}$$

$$= \frac{4\sqrt{5}}{5}$$

Reduce

$$\left(\frac{4}{\sqrt{5}}\right)\left(\frac{\sqrt{5}}{\sqrt{5}}\right)$$

$$\frac{4\sqrt{5}}{5}$$

$$\frac{\sqrt{10}}{\sqrt{6}}\left(\frac{\sqrt{6}}{\sqrt{6}}\right)$$

$$= \frac{\sqrt{60}}{6}$$

$$= \frac{2\sqrt{15}}{6}$$

$$= \frac{\sqrt{15}}{3} = \cancel{}$$

$$\frac{\sqrt{10}}{\sqrt{6}} = \frac{\sqrt{5}}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right)$$

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

$$\frac{3\sqrt{10}}{2\sqrt{6}}\left(\frac{\sqrt{6}}{\sqrt{6}}\right)$$

$$= \frac{3\sqrt{60}}{2(6)}$$

$$= \frac{3(2\sqrt{15})}{12}$$

$$= \boxed{\frac{6\sqrt{15}}{12}}$$

$$= \frac{1}{2}\sqrt{15} \qquad = \frac{1\sqrt{15}}{2}$$

$$\frac{3\sqrt{10}}{2\sqrt{6}}\left(\frac{2\sqrt{6}}{2\sqrt{6}}\right)$$

$$\frac{6\sqrt{60}}{4(6)} = \frac{6(2\sqrt{15})}{24}$$

$$= \frac{12\sqrt{15}}{24} = \frac{\sqrt{15}}{2}$$

OR

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

$$\frac{3\sqrt{15}}{2(3)}$$

$$\frac{3\sqrt{15}}{6}$$

$$= \frac{\sqrt{15}}{2}$$

Attachments

Text Solns_p. 38 Ques. 36 - 45.doc

Review - Complex Numbers.doc

Review Solns - Complex Numbers.doc