5.2 notes pt 2

Tuesday, March 10, 2020 1:13 PM

PreCalc 11

5.2-Working with Radicals pt 2
Dividing

$\frac{2\sqrt{15}}{4\sqrt{20}} = \frac{2}{4}\sqrt{\frac{15}{20}} = \frac{1\sqrt{3}}{2\sqrt{4}}$

When ***dividing*** radicals: divide/reduce the ***coefficients*** together and divide/reduce the ***radicands*** together.

$\sqrt{3}\cdot\sqrt{3} = 3$

You can only divide radicals that have the ***same index***.

Then you ***MUST rationalize*** the denominator (the denominator must be a ***positive whole number, not a radical***).

Simplify by rationalizing the denominator:

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

$\frac{5}{2\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{5\sqrt{7}}{2\cdot 7} = \frac{5\sqrt{7}}{14}$

$\frac{4\sqrt{30}}{16\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}}$ ★ reduce

$= \frac{4\sqrt{450}}{16\cdot 15} = \frac{4\cdot 15\sqrt{2}}{240} = \frac{60\sqrt{2}}{240} = \frac{\sqrt{2}}{4}$

$= \frac{1\sqrt{2}}{4} = \frac{\sqrt{2}}{4}$

$\sqrt{450} = \sqrt{225}\cdot\sqrt{2} = 15\sqrt{2}$

★ multiply denominator to make it a perfect cube root.

1, 8, 27, 64, 125

$\frac{4\sqrt{5}}{28\sqrt{10}} = \frac{1\sqrt{1}}{7\sqrt{2}} = \frac{1}{7\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{7\cdot 2} = \frac{\sqrt{2}}{14}$

$\frac{2\sqrt[3]{4}}{3\sqrt[3]{12}} = \frac{2\sqrt[3]{4}}{3\sqrt[3]{3}}\cdot\frac{\sqrt[3]{9}}{\sqrt[3]{9}} = \frac{2\sqrt[3]{9}}{3\sqrt[3]{27}} = \frac{2\sqrt[3]{9}}{3\cdot 3} = \frac{2\sqrt[3]{9}}{9}$

$\frac{\sqrt{21x^5y^{-3}z}}{\sqrt{7x^3y^5z^{-2}}} = \frac{\sqrt{3x^2}}{\sqrt{y^3}}\cdot\frac{\sqrt{y^3}}{\sqrt{y^3}} = \frac{\sqrt{3x^2\cdot y}}{y^3} = \frac{x\sqrt{3y}}{y^{3-2}} = \frac{x\sqrt{3y}}{y^2}$

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

$\sqrt{m^4n^3} = m^2n\sqrt{n}$

$x^2 - 1 = (x+1)(x-1)$ conjugates

$x^2 - 1$

$= (x+1)(x-1)$ conjugates

When the denominator is a ***binomial***: rationalize the denominator using the ***conjugate*** (the same ***two*** terms separated with ***opposite signs***).

$$\frac{2}{4+\sqrt{5}} \cdot \frac{4-\sqrt{5}}{4-\sqrt{5}}$$

$$= \frac{8-2\sqrt{5}}{16-4\sqrt{5}+4\sqrt{5}-5}$$

$$= \frac{8-2\sqrt{5}}{11}$$

or

$$= \boxed{\frac{2(4-\sqrt{5})}{11}}$$

$$\frac{2}{3-\sqrt{10}} \cdot \frac{3+\sqrt{10}}{3+\sqrt{10}}$$

$$= \frac{6+2\sqrt{10}}{9+3\sqrt{10}-3\sqrt{10}-10}$$

$$= \frac{6+2\sqrt{10}}{-1} \cdot \frac{-1}{-1}$$

★ don't leave negative denominators

$$= -6-2\sqrt{10}$$

$$= \boxed{-2(3+\sqrt{10})}$$

$$\frac{4}{2-\sqrt{8}} \cdot \frac{2+\sqrt{8}}{2+\sqrt{8}}$$

$\sqrt{8} = \sqrt{4}\sqrt{2} = 2\sqrt{2}$

$$= \frac{8+4\sqrt{8}}{4-8}$$

$$= \frac{8+4\cdot 2\sqrt{2}}{-4}$$

$$= \frac{8+8\sqrt{2}}{-4}$$

$$= \frac{8(1+\sqrt{2})}{-4}$$

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

$$\frac{4}{2-\sqrt{8}}$$

$$= \frac{4}{2-2\sqrt{2}}$$

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

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

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

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

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

$$\frac{2}{6+\sqrt{6}} \cdot \frac{6-\sqrt{6}}{6-\sqrt{6}}$$

$$= \frac{2(6-\sqrt{6})}{36-6}$$

$$= \frac{\cancel{2}(6-\sqrt{6})}{\cancel{30}15}$$

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

HW: p 289 Questions: 6, 7b, 8ab, 10, 11ab