Math 20-1

KEY

L60 – 5.2 Dividing Radical Expressions (Part 2)

Part 1 – Dividing Monomials

Q1: Simplify the following expressions:

$\frac{10}{5} = 2$

$\frac{10^{1/2}}{5^{1/2}} = \left(\frac{10}{5}\right)^{1/2} = (2)^{1/2}$

$\frac{\sqrt{10}}{\sqrt{5}} = \sqrt{\frac{10}{5}} = \sqrt{2}$

$\frac{\sqrt{40}}{\sqrt{10}} = \sqrt{\frac{40}{10}} = \sqrt{4} = 2$

$\frac{2\sqrt{18}}{4\sqrt{2}} = \frac{1\sqrt{18}}{2\sqrt{2}} = \frac{1}{2}\sqrt{9}$

$= \frac{3}{2}$

$\frac{3\sqrt{26}}{\sqrt{13}} = \frac{3}{1}\sqrt{\frac{26}{13}} = 3\sqrt{2}$

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Part 2 – Rationalizing a Monomial Denominator

Q2: Rationalize the Denominator:

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

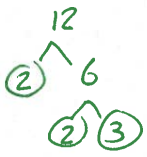
where x can't be zero, or a negative number.
So $x > 0$.

$\frac{3}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{3\sqrt{7}}{7}$

$\frac{(x+\sqrt{3})}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}x+3}{3}$

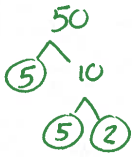
$\frac{\sqrt{6}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{12}}{2} = \frac{2\sqrt{3}}{2}$

$= \sqrt{3}$



$\frac{(4+\sqrt{10})}{\sqrt{5}} \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{5}+\sqrt{50}}{5}$

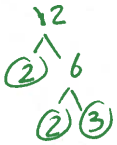
$= \frac{4\sqrt{5}+5\sqrt{2}}{5}$



$\frac{(\sqrt{6}+12\sqrt{2})}{\sqrt{6}} \frac{\sqrt{6}}{\sqrt{6}} = \frac{6+12\sqrt{12}}{6}$

$= \frac{6+12 \cdot 2\sqrt{3}}{6} = \frac{6+24\sqrt{3}}{6}$

$= 1+4\sqrt{3}$



Part 3 – Rationalizing a Binomial Denominator

Q3: Simplify the following expressions:

$(x+5)(x+5)$

$x^2+5x+5x+25$

$x^2+10x+25$

$(x+5)(x-5)$

$x^2-5x+5x-25$

x^2-25

$(\sqrt{3}+5)(\sqrt{3}+5)$

$3+5\sqrt{3}+5\sqrt{3}+25$

$28+10\sqrt{3}$

$(\sqrt{3}+5)(\sqrt{3}-5)$

$3-5\sqrt{3}+5\sqrt{3}-25$

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Q4: Rationalize the Denominator:

$\frac{(2+\sqrt{5})(\sqrt{5}-3)}{(\sqrt{5}+3)(\sqrt{5}-3)} = \frac{2\sqrt{5}-6+5-3\sqrt{5}}{5-3\sqrt{5}+3\sqrt{5}-9}$

$= \frac{-\sqrt{5}-1}{-4} = \frac{\sqrt{5}+1}{4}$

$\frac{(\sqrt{3}-2)(5+\sqrt{3})}{(5-\sqrt{3})(5+\sqrt{3})} = \frac{5\sqrt{3}+3-10-2\sqrt{3}}{25+5\sqrt{3}-5\sqrt{3}-3}$

$= \frac{3\sqrt{3}-7}{22}$

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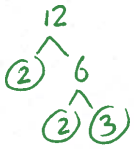
$$\frac{(\sqrt{6}+\sqrt{2})}{(\sqrt{2}+2)}\cdot\frac{(\sqrt{2}-2)}{(\sqrt{2}-2)} = \frac{\sqrt{12}-2\sqrt{6}+2-2\sqrt{2}}{2-2\sqrt{2}+2\sqrt{2}-4}$$

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

$$\frac{(6)}{(1-2\sqrt{3})}\cdot\frac{(1+2\sqrt{3})}{(1+2\sqrt{3})} = \frac{6+12\sqrt{3}}{1+2\sqrt{3}-2\sqrt{3}-4(3)}$$

$$= \frac{6+12\sqrt{3}}{-11}$$



$$\frac{(\sqrt{5})}{(3\sqrt{2}-1)}\cdot\frac{(3\sqrt{2}+1)}{(3\sqrt{2}+1)} = \frac{3\sqrt{10}+\sqrt{5}}{9(2)+3\sqrt{2}-3\sqrt{2}-1}$$

$$= \frac{3\sqrt{10}+\sqrt{5}}{17}$$

$$\frac{6}{2\sqrt{3}}\cdot\frac{2\sqrt{3}}{2\sqrt{3}} = \frac{12\sqrt{3}}{4(3)} = \frac{12\sqrt{3}}{12} = \sqrt{3}$$