Math 20-1

KEY

L59 – 5.2 Multiplying Radical Expressions (Part 1)

Key Ideas

When multiplying radicals:

- **Index's must be the same for it to be multiplied (square roots multiplying square roots, cube roots multiplying cube roots, etc).**
- **Multiply the coefficient values with each other.**
- Multiply the radicands (numbers under the roots) together.
- **Simplify as much as possible afterwards.**

Part 1 – Multiplying Monomials

Q1: Simplify each of the following:

$(3x)(4x)$

$12x^2$

$(3\sqrt{2})(4\sqrt{2})$

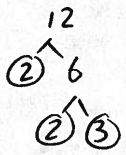
$12\sqrt{4}$
$12(2)$
24

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

$10\sqrt{36}$
$10(6)$
60

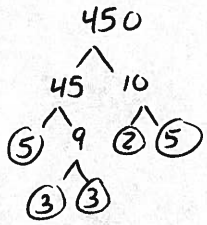
$(3\sqrt{6})(5\sqrt{2})$

$15\sqrt{12}$
$15\sqrt{2^2 \cdot 3}$
$15 \cdot 2\sqrt{3}$
$30\sqrt{3}$



$(4\sqrt{15})(3\sqrt{30})$

$12\sqrt{450}$
$12\sqrt{2 \cdot 3^2 \cdot 5^2}$
$12 \cdot 3 \cdot 5\sqrt{2}$
$180\sqrt{2}$



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Part 2 – Multiplying Binomials

Q2: Simplify each of the following:

$(x+3)(2x-7)$

$2x^2-7x+6x-21$

$2x^2-x-21$

	$2x$	-7
x	$2x^2$	$-7x$
$+3$	$+6x$	-21

Alternative Method

$(\sqrt{5}+3)(2\sqrt{5}-7)$

$2\sqrt{25}-7\sqrt{5}+6\sqrt{5}-21$

$2(5)-7\sqrt{5}+6\sqrt{5}-21$

$10-7\sqrt{5}+6\sqrt{5}-21$

$-11-\sqrt{5}$

	$2\sqrt{5}$	-7
$\sqrt{5}$	$2\sqrt{25}$	$-7\sqrt{5}$
$+3$	$+6\sqrt{5}$	-21

Alternative Method

$(4\sqrt{2}+1)(3\sqrt{2}+5)$

$12\sqrt{4}+20\sqrt{2}+3\sqrt{2}+5$

$12(2)+20\sqrt{2}+3\sqrt{2}+5$

$24+20\sqrt{2}+3\sqrt{2}+5$

$29+23\sqrt{2}$

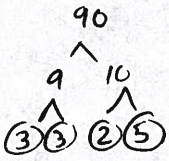
$(3\sqrt{6}-1)(2-\sqrt{15})$

$6\sqrt{6}-3\sqrt{90}-2+\sqrt{15}$

$6\sqrt{6}-3\sqrt{3^2\cdot 2\cdot 5}-2+\sqrt{15}$

$6\sqrt{6}-3\cdot 3\sqrt{2\cdot 5}-2+\sqrt{15}$

$6\sqrt{6}-9\sqrt{10}-2+\sqrt{15}$



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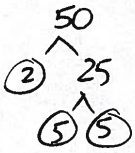
Part 3 – Multiplying Radical Expressions

Q3: Simplify each of the following:

$(\sqrt{50x^2})(5\sqrt{3x}+\sqrt{2})$

$(5x\sqrt{2})(5\sqrt{3x}+\sqrt{2})$



$\sqrt{50x^2} = \sqrt{2\cdot 5^2\cdot x^2}$

$= 5x\sqrt{2}$

$25x\sqrt{6x} + 5x\sqrt{4}$

$25x\sqrt{6x} + 5x(2)$

$25x\sqrt{6x} + 10x$

$(2\sqrt{3x}-5)(2+6\sqrt{2x})$

$4\sqrt{3x} + 12\sqrt{6x^2} - 10 - 30\sqrt{2x}$

$4\sqrt{3x} + 12x\sqrt{6} - 10 - 30\sqrt{2x}$