Math 20-2 KEY

L02 – Adding, Subtracting, Restrictions

Part 1 – Collecting Like Terms

Q1: For each of the following expressions, simplify.

$2x + 5x$

$7x$

$2y + 5y$

$7y$

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

$7\sqrt{3}$

$4x + 5y + 6x + 7y$

$10x + 12y$

$4\sqrt{2} + 5\sqrt{3} + 6\sqrt{2} + 7\sqrt{3}$

$10\sqrt{2} + 12\sqrt{3}$

Part 2 – Adding and Subtracting Radicals

Q2: Covert $\sqrt{18}$ to a mixed radical.

18 → 2, 9; 9 → 3, 3

$\sqrt{3^2 \cdot 2}$

$3\sqrt{2}$

Q3: Convert $\sqrt{8}$ to a mixed radical.

8 → 2, 4; 4 → 2, 2

$\sqrt{2^2 \cdot 2}$

$2\sqrt{2}$

Q4: Simplify $\sqrt{18} + \sqrt{8}$

$3\sqrt{2} + 2\sqrt{2}$

$5\sqrt{2}$

Q5: Covert $\sqrt{75}$ to a mixed radical.

75 → 3, 25; 25 → 5, 5

$\sqrt{3 \cdot 5^2}$

$5\sqrt{3}$

Q6: Convert $\sqrt{48}$ to a mixed radical.

48 → 2, 24; 24 → 2, 12; 12 → 2, 6; 6 → 2, 3

$\sqrt{2^2 \cdot 2^2 \cdot 3}$

$2 \cdot 2\sqrt{3}$

$4\sqrt{3}$

Q7: Simplify $\sqrt{75} + \sqrt{48}$

$5\sqrt{3} + 4\sqrt{3}$

$9\sqrt{3}$

Math 20-2

KEY

Q8: Simplify the expression $\sqrt{50} - \sqrt{8}$

$\sqrt{2 \cdot 5^2} - \sqrt{2^2 \cdot 2}$

$5\sqrt{2} - 2\sqrt{2}$

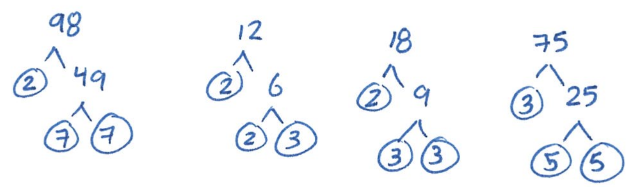
$3\sqrt{2}$

Q9: Simplify the expression $\sqrt{98} + \sqrt{12} + \sqrt{18} - \sqrt{75}$

$\sqrt{2 \cdot 7^2} + \sqrt{2^2 \cdot 3} + \sqrt{2 \cdot 3^2} - \sqrt{3 \cdot 5^2}$

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

$10\sqrt{2} - 3\sqrt{3}$



Q10: Simplify the expression $\sqrt{12} - \sqrt{5} + \sqrt{45}$

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

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

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

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Part 3 – Restrictions

Q11: State the restrictions on each radical.

$\sqrt{x}$

$x \geq 0$

$\sqrt{x^2}$

$x^2 \geq 0$

$x \in \mathbb{R}$
No restrictions

$\sqrt{x^3}$

$x^3 \geq 0$

$x \geq 0$

$\sqrt{x^4}$

$x^4 \geq 0$

$x \in \mathbb{R}$
No restrictions

$\sqrt[3]{x}$

$x \in \mathbb{R}$
No restrictions

$\sqrt{\frac{1}{x^2}}$

$\frac{1}{x^2} \geq 0$

This will always be true.
However, additional restriction where we can't divide by ∅.

So $x^2 \neq 0$

$x \neq 0$

$\sqrt{x-2}$

$x - 2 \geq 0$
$+2 \quad +2$

$x \geq 2$

$\sqrt{2x+1}$

$2x + 1 \geq 0$
$-1 \quad -1$

$2x \geq -1$
$\div 2 \quad \div 2$

$x \geq -\frac{1}{2}$