

September 10th, 2007

Radicals

ADDITION / SUBTRACTION

$$\text{Ex 1: } \sqrt{3} + \sqrt{3} = 2\sqrt{3}$$

$$\text{Ex 2: } 2\sqrt{5} + 3\sqrt{5} = 5\sqrt{5}$$

$$\begin{aligned} \text{Ex 3: } 3\sqrt{abc} + 2\sqrt{abc} - \sqrt{abc} + 6\sqrt{ab} \\ = 4\sqrt{abc} + 6\sqrt{ab} \end{aligned}$$

$$\begin{aligned} \text{Ex 4: } \sqrt{50} + \sqrt{8} \\ = \sqrt{25} \sqrt{2} + \sqrt{4} \sqrt{2} \\ = 5\sqrt{2} + 2\sqrt{2} \\ = 7\sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{Ex 5: } \sqrt{27} - \sqrt{12} \\ = \sqrt{9} \sqrt{3} - \sqrt{4} \sqrt{3} \\ = 3\sqrt{3} - 2\sqrt{3} \\ = 1\sqrt{3} \end{aligned}$$

$$\begin{aligned} \text{Ex 6: } 2\sqrt{32} + 3\sqrt{8} \\ = 2\sqrt{4} \sqrt{4} \sqrt{2} + 3\sqrt{4} \sqrt{2} \\ = 2 \cdot 2 \cdot 2\sqrt{2} + 3 \cdot 2\sqrt{2} \\ = 8\sqrt{2} + 6\sqrt{2} \\ = 14\sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{Ex 7: } 3\sqrt{9x^2y} + 2x\sqrt{y} + 3\sqrt{xy} \\ = 3 \cdot 3x\sqrt{y} + 2x\sqrt{y} + 3\sqrt{xy} \\ = 9x\sqrt{y} + 2x\sqrt{y} + 3\sqrt{xy} \\ = 11x\sqrt{y} + 3\sqrt{xy} \end{aligned}$$

$$\begin{aligned}
 \text{Ex 8: } & 3\sqrt{5x} + 6\sqrt{25x} - \sqrt{5x} \\
 & = 3\sqrt{5x} + 6\sqrt{25}\sqrt{5x} - \sqrt{5x} \\
 & = 3\sqrt{5x} + 6 \cdot 5\sqrt{5x} - \sqrt{5x} \\
 & = 3\sqrt{5x} + 30\sqrt{5x} - \sqrt{5x} \\
 & = 32\sqrt{5x}
 \end{aligned}$$

MULTIPLICATION

$$\begin{aligned}
 \text{Ex 1: } & \sqrt{3}(2\sqrt{3} + \sqrt{6}) \\
 & = 2\sqrt{3}\sqrt{3} + \sqrt{6}\sqrt{3} \\
 & = 6 + 3\sqrt{2}
 \end{aligned}$$

$$\begin{aligned}
 \text{Ex 2: } & (\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3}) \\
 & = \sqrt{2}\sqrt{2} + \sqrt{2}\sqrt{3} - \sqrt{3}\sqrt{2} - \sqrt{3}\sqrt{3} \\
 & = 2 + \sqrt{6} - \sqrt{6} - 3 \\
 & = -1
 \end{aligned}$$

$$\begin{aligned}
 \text{Ex 3: } & (\sqrt{3x} + \sqrt{4y})^2 \\
 & = (\sqrt{3x} + \sqrt{4y})(\sqrt{3x} + \sqrt{4y}) \\
 & = \sqrt{3x}\sqrt{3x} + \sqrt{3x}\sqrt{4y} + \sqrt{4y}\sqrt{3x} + \sqrt{4y}\sqrt{4y} \\
 & = 3x + 2\sqrt{3xy} + 2\sqrt{3xy} + 4y \\
 & = 3x + 4\sqrt{3xy} + 4y
 \end{aligned}$$