

Objective: Simplify Products of Radical Expressions

Concept

Properties of Radical Expressions

1. $a \cdot \sqrt{b} = a\sqrt{b}$

2. $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$

3. $\sqrt{a} \cdot \sqrt{a} = \sqrt{a^2} = a$

4. $c(a + \sqrt{b}) = ac + c\sqrt{b}$

5. $\sqrt{b}(a + \sqrt{c}) = a\sqrt{b} + \sqrt{bc}$

6. $b\sqrt{a} + c\sqrt{a} = (b + c)\sqrt{a}$

7. $\sqrt{a} + \sqrt{b} = \sqrt{a} + \sqrt{b}$



Objective: Simplify Products of Radical Expressions

Ex) Simplify each product.

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

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

$$\boxed{10 - 5\sqrt{3}}$$

$$\sqrt{2}(6 + \sqrt{10})$$

$$\sqrt{2} \cdot 6 + \sqrt{2} \cdot \sqrt{10}$$

$$6\sqrt{2} + \sqrt{20} \star$$

$$\sqrt{4} \cdot \sqrt{5}$$

$$\boxed{6\sqrt{2} + 2\sqrt{5}}$$

Objective: Simplify Products of Radical Expressions

Ex) Simplify each product.

$$\sqrt{6}(-3 - \sqrt{6})$$

$$\sqrt{6} \cdot -3 - \sqrt{6} \cdot \sqrt{6}$$

$$-3\sqrt{6} - 6$$

$$\boxed{-6 - 3\sqrt{6}}$$

$$4\sqrt{3}(7 + \sqrt{6})$$

$$4 \cdot 7 \cdot \sqrt{3} + 4 \cdot \sqrt{3} \cdot \sqrt{6}$$

$$28\sqrt{3} + 4\sqrt{18} \star$$

$$\sqrt{9} \cdot \sqrt{2}$$

$$4 \cdot 3 \cdot \sqrt{2}$$

$$28\sqrt{3} + 12\sqrt{2}$$

$$\boxed{12\sqrt{2} + 28\sqrt{3}}$$

Objective: Simplify Products of Radical Expressions

Ex) Simplify each product.

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

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

$$\underline{-10} - \underline{2\sqrt{3}} + \underline{-5\sqrt{3}} - \underline{\sqrt{3}^2}$$

$$-10 + -3 \quad -2\sqrt{3} + -5\sqrt{3}$$

$$\boxed{-13 - 7\sqrt{3}}$$

$$(-2 - 3\sqrt{2})(-8 - \sqrt{2})$$

$$-2(-8 - \sqrt{2}) + -3\sqrt{2}(-8 - \sqrt{2})$$

$$\underline{16} + \underline{2\sqrt{2}} + \underline{24\sqrt{2}} + \underline{3\sqrt{2}^2}$$

$$16 + 6 \quad 2\sqrt{2} + 24\sqrt{2}$$

$$\boxed{22 + 26\sqrt{2}}$$

Objective: Simplify Products of Radical Expressions

Ex) Simplify each product.

$$(2 + \sqrt{15})(5 + \sqrt{3})$$

$$2(5 + \sqrt{3}) + \sqrt{15}(5 + \sqrt{3})$$

$$10 + 2\sqrt{3} + 5\sqrt{15} + \sqrt{45} \begin{matrix} \text{A} \\ \sqrt{9 \cdot 5} \\ + 3\sqrt{5} \end{matrix}$$

$$10 + 2\sqrt{3} + 3\sqrt{5} + 5\sqrt{15}$$

Objective: Simplify Products of Radical Expressions

Ex) Simplify each product.

$$(\sqrt{x} - 3)(\sqrt{x} + 4)$$

$$\sqrt{x}(\sqrt{x} + 4) + -3(\sqrt{x} + 4)$$

$$\sqrt{x^2} + \underline{4\sqrt{x}} + \underline{-3\sqrt{x}} - 12$$

$$x + \sqrt{x} - 12$$

Objective: Simplify Products of Radical Expressions

Ex) Simplify each product.

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

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

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

$$\sqrt{\cancel{(x-2)}^{\cdot}} + \underline{3\sqrt{x-2}} + \underline{3\sqrt{x-2}} + \underline{9}$$

$$\underline{x-2}$$

$$x + 6\sqrt{x-2} + 7$$