

8.4 Operations with Radicals

■ Need To Know



- Recall Like Terms
- Recall Radical Simplification
- Add and Subtract Radicals
- More Multiplication of Radical
- More Rationalizing Denominators

Recall Simplify Radicals

■ Recall properties and Perfects

$$1. \sqrt{xy} = \sqrt{x}\sqrt{y}$$

$$2. \sqrt{\frac{x}{y}} = \frac{\sqrt{x}}{\sqrt{y}}$$

$$\sqrt{48}$$

Perfect
Square

1
4
9
16
25
36
49
64
81
100
121
144



Recall Like Terms

- Recall:
- $ab + ac$

Simplify:

$$4x + 7x$$

Simplify:

$$4\sqrt{2} + 7\sqrt{2}$$



Add and Subtract Radicals

- Simplify each:

$$5\sqrt{2} - 8\sqrt{2}$$

$$9\sqrt{3} - 4\sqrt{3} + \sqrt{3}$$

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

$$12\sqrt{14y} - \sqrt{14y}$$



Practice

- Simplify Each

$$3\sqrt{12} + 5\sqrt{48}$$

$$4\sqrt{18} + \sqrt{32} - \sqrt{2}$$



Multiplication

- Multiply each:

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

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

$$(\sqrt{x} + 8)(\sqrt{x} - 6)$$



Multiplication

- Multiply each:

$$(\sqrt{5} - 4)^2$$

$$(\sqrt{x} + \sqrt{7})(\sqrt{x} - \sqrt{7})$$

Remember: $(x+y)(x-y) = x^2 - y^2$



Division of Radical Expression

- Recall rationalizing denominators.
- Goal: Change the fraction to make the denominator come out "nice".

$$\frac{\sqrt{5}}{\sqrt{3}}$$

$$\frac{\sqrt{5}}{\sqrt{5} - \sqrt{3}}$$



Division of Radical Expression

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Remember: $(x+y)(x-y) = x^2 - y^2$



Practice

- Rationalize the denominator in each:

$$\frac{2}{3 - \sqrt{7}}$$

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

end