7.7 Rationalizing the Denominator of a Radical Expression Using Conjugates

• Example 1

Rationalize the denominator and simplify.

$$\frac{\sqrt{3}-4}{4-2\sqrt{3}}$$

We begin by multiplying both numerator and denominator by the conjugate of the denominator and combining like terms.

$$\frac{\sqrt{3}-4}{4-2\sqrt{3}} \cdot \frac{4+2\sqrt{3}}{4+2\sqrt{3}} = \frac{4\sqrt{3}+2(3)-16-8\sqrt{3}}{4^2-(2\sqrt{3})^2}$$

$$= \frac{-4\sqrt{3}-8}{4}$$

Next, we factor and cancel the common factors to obtain the answer.

$$\frac{-4\sqrt{3}-8}{4} = \frac{4(-\sqrt{3}-2)}{4}$$

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

CHECK YOURSELF 1

Rationalize the denominator and simplify.

$$\frac{\sqrt{2}-3}{8-2\sqrt{3}}$$

CHECK YOURSELF ANSWER

1. $\dfrac{4\sqrt{2}+\sqrt{6}-12-3\sqrt{3}}{26}$.

7.7 Exercises

Name

Section Date

ANSWERS

1.

2.

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Rationalize the denominator and simplify each of the following.

1. $\dfrac{\sqrt{2} - 6}{10 - 2\sqrt{2}}$

2. $\dfrac{3 + \sqrt{6}}{3 - \sqrt{6}}$

3. $\dfrac{\sqrt{5} - 4}{3 - 4\sqrt{10}}$

4. $\dfrac{\sqrt{11} + 9}{9 - 2\sqrt{3}}$

5. $\dfrac{4 - \sqrt{7}}{8 - 4\sqrt{5}}$

6. $\dfrac{\sqrt{2} - 6}{6 - 3\sqrt{6}}$