



# 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.

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

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

$$\begin{aligned}\frac{-4\sqrt{3} - 8}{4} &= \frac{4(-\sqrt{3} - 2)}{4} \\ &= -\sqrt{3} - 2\end{aligned}$$

## • • • CHECK YOURSELF 1

Rationalize the denominator and simplify.

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

---

## • • • CHECK YOURSELF ANSWER

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

---

# 7.7 Exercises

Name \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

## A N S W E R S

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

Rationalize the denominator and simplify each of the following.

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

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

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

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

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

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