

LARSON ALGEBRA 1**CHAPTER 12, LESSON 2, EXTRA EXAMPLE*****Extra Example 3 Simplifying Radicals***

Simplify.

a. $\frac{12}{\sqrt{6}}$

b. $\frac{3}{1 + \sqrt{5}}$

c. $\frac{2 + \sqrt{27}}{1 - \sqrt{3}}$

SOLUTION

a. $\frac{12}{\sqrt{6}} = \frac{12}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}}$

Multiply numerator and denominator by $\sqrt{6}$.

$$= \frac{12\sqrt{6}}{6}$$

Multiply fractions.

$$= 2\sqrt{6}$$

Simplify.

b. $\frac{3}{1 + \sqrt{5}} = \frac{3}{1 + \sqrt{5}} \cdot \frac{1 - \sqrt{5}}{1 - \sqrt{5}}$

Multiply numerator and denominator by the conjugate.

$$= \frac{3(1 - \sqrt{5})}{(1 + \sqrt{5})(1 - \sqrt{5})}$$

Multiply fractions.

$$= \frac{3 - 3\sqrt{5}}{1 - 5}$$

Simplify.

$$= -\frac{3 - 3\sqrt{5}}{4}$$

Simplify.

c. $\frac{(2 + \sqrt{27})}{(1 - \sqrt{3})} = \frac{2 + \sqrt{27}}{1 - \sqrt{3}} \cdot \frac{1 + \sqrt{3}}{1 + \sqrt{3}}$

Multiply numerator and denominator by the conjugate.

$$= \frac{(2 + \sqrt{27})(1 + \sqrt{3})}{(1 - \sqrt{3})(1 + \sqrt{3})}$$

Multiply fractions.

$$= \frac{2 + 2\sqrt{3} + \sqrt{27} + 81}{1 - 3}$$

Simplify.

$$= -\frac{2 + 2\sqrt{3} + 3\sqrt{3} + 81}{2}$$

Simplify.

$$= -\frac{83 + 5\sqrt{3}}{2}$$

Simplify.