



Practice Solutions – III

1. Simplify the following expressions by rationalizing the denominator.

a. $\frac{2}{\sqrt{2}}$

$$\begin{aligned}\frac{2}{\sqrt{2}} &= \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \\ &= \frac{2\sqrt{2}}{\sqrt{2^2}} \\ &= \frac{2\sqrt{2}}{2} \\ &= \sqrt{2}\end{aligned}$$

b. $\frac{6}{\sqrt[3]{4u}}$

$$\begin{aligned}\frac{6}{\sqrt[3]{4u}} &= \frac{6}{\sqrt[3]{4u}} \cdot \frac{(\sqrt[3]{4u})^2}{(\sqrt[3]{4u})^2} \\ &= \frac{6(\sqrt[3]{4u})^2}{\sqrt[3]{(4u)^3}} \\ &= \frac{6(\sqrt[3]{4u})^2}{4u} \\ &= \frac{3(\sqrt[3]{4u})^2}{2u}\end{aligned}$$

c. $\frac{\sqrt{2}}{5\sqrt{7}}$

$$\begin{aligned}\frac{\sqrt{2}}{5\sqrt{7}} &= \frac{\sqrt{2}}{5\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} \\ &= \frac{\sqrt{14}}{5 \cdot 7} \\ &= \frac{\sqrt{14}}{35}\end{aligned}$$

2. Simplify the following expressions by rationalizing the denominator.

a. $\frac{3}{\sqrt{2}-5}$

$$\begin{aligned}\frac{3}{\sqrt{2}-5} &= \frac{3}{\sqrt{2}-5} \cdot \frac{\sqrt{2}+5}{\sqrt{2}+5} \\ &= \frac{3(\sqrt{2}+5)}{(\sqrt{2}-5)(\sqrt{2}+5)} \\ &= \frac{3\sqrt{2}+15}{2-25} \\ &= \frac{3\sqrt{2}+15}{-23} \\ &= -\frac{3\sqrt{2}+15}{23}\end{aligned}$$

b. $\frac{7\sqrt{2}}{\sqrt{5}+\sqrt{6}}$

$$\begin{aligned}\frac{7\sqrt{2}}{\sqrt{5}+\sqrt{6}} &= \frac{7\sqrt{2}}{\sqrt{5}+\sqrt{6}} \cdot \frac{\sqrt{5}-\sqrt{6}}{\sqrt{5}-\sqrt{6}} \\ &= \frac{7\sqrt{2}(\sqrt{5}-\sqrt{6})}{(\sqrt{5}+\sqrt{6})(\sqrt{5}-\sqrt{6})} \\ &= \frac{7\sqrt{10}-7\sqrt{12}}{5-6} \\ &= \frac{7\sqrt{10}-14\sqrt{3}}{-1} \\ &= 14\sqrt{3}-7\sqrt{10}\end{aligned}$$

3. Identify and fix the error(s) in Portia's simplification of the expression, $\frac{4\sqrt{5} - \sqrt{2}}{6 - \sqrt{15}}$ by rationalizing the denominator.

$$\begin{aligned}\frac{4\sqrt{5} - \sqrt{2}}{6 - \sqrt{15}} \cdot \frac{6 - \sqrt{15}}{6 - \sqrt{15}} &= \frac{24\sqrt{5} + \sqrt{30}}{36 + 15} \\ &= \frac{24\sqrt{5} + \sqrt{30}}{51}\end{aligned}$$

Portia did not multiply by the conjugate of the denominator. Also, Portia did not follow the distributive property for multiplying binomials (FOIL).

The correct solution is:

$$\begin{aligned}\frac{4\sqrt{5} - \sqrt{2}}{6 - \sqrt{15}} &= \frac{4\sqrt{5} - \sqrt{2}}{6 - \sqrt{15}} \cdot \frac{6 + \sqrt{15}}{6 + \sqrt{15}} \\ &= \frac{(4\sqrt{5} - \sqrt{2})(6 + \sqrt{15})}{(6 - \sqrt{15})(6 + \sqrt{15})} \\ &= \frac{24\sqrt{5} + 4\sqrt{75} - 6\sqrt{2} - \sqrt{30}}{36 - 15} \\ &= \frac{24\sqrt{5} + 20\sqrt{3} - 6\sqrt{2} - \sqrt{30}}{21}\end{aligned}$$

Please complete *Lesson 3.2 Explore Your Understanding Assignment* located in *Workbook 3A* before proceeding to *Lesson 3.3*.