## Practice Run

State any restrictions on the variable and then simplify each expression.

1. $-3y^3\sqrt{18y^3}$

2. $-2\sqrt{a}(4\sqrt{5}-8a)$

3. $\dfrac{48\sqrt{z^5}}{-6\sqrt{16z^3}}$

Compare your answers.

State any restrictions on the variable and then simplify each expression.

1. $-3y^3\sqrt{18y^3}$ **Note:** $y$ cannot be negative

$$
\begin{aligned}
&= -3y^3\sqrt{9 \cdot 2 \cdot y \cdot y \cdot y} \\
&= -3y^3\sqrt{3^2 \cdot 2 \cdot y^2 \cdot y} \\
&= -3y^3 \cdot 3 \cdot y\sqrt{2 \cdot y} \\
&= -3 \cdot 3 \cdot y^3 \cdot y\sqrt{2y} \\
&= -9 \cdot y^{3+1}\sqrt{2y} \\
&= -9y^4\sqrt{2y} \quad \text{when } y \geq 0, \text{ and } y \in \mathrm{R}
\end{aligned}
$$

2. $-2\sqrt{a}(4\sqrt{5} - 8a)$ **Note:** $a$ cannot be negative

$$
\begin{aligned}
&= ((-2\sqrt{a}) \cdot 4\sqrt{5}) - ((-2\sqrt{a}) \cdot 8a) \\
&= (-8\sqrt{5a}) - (-16a\sqrt{a}) \\
&= -8\sqrt{5a} + 16a\sqrt{a} \quad \text{when } a \geq 0, \text{ and } a \in \mathrm{R}
\end{aligned}
$$

3. $\dfrac{48\sqrt{z^5}}{-6\sqrt{16z^3}}$ **Note:** $z$ cannot be negative

$$
\begin{aligned}
&= \frac{-8\sqrt{z^5}}{\sqrt{4^2 z^3}} \\
&= \frac{-8\sqrt{z^5}}{4\sqrt{z^3}} \\
&= \frac{-8}{4} \cdot \frac{\sqrt{z^5}}{\sqrt{z^3}} \\
&= -2 \cdot \sqrt{\frac{z^5}{z^3}} \\
&= -2\sqrt{z^{5-3}} \\
&= -2\sqrt{z^2} \\
&= -2z \text{ when } z \geq 0, \text{ and } z \in \mathrm{R}
\end{aligned}
$$

*Although there is no radical in the final, simplified expression, the restrictions placed on the variable are based on the original expression $\dfrac{48\sqrt{z^5}}{-6\sqrt{16z^3}}$.