7.2 Using Properties of Real and Rational Exponents

Std. 12.0

Examples: *Simplify to an integer or fraction if possible; or leave in simplest radical form.*

1. $\dfrac{x^{5\sqrt{2}}}{x^{\sqrt{2}}}$ $\quad x^{5\sqrt{2}-\sqrt{2}} = x^{4\sqrt{2}}$

2. $\dfrac{x^{1/3}y^{-1/5}}{x^{1/3}y^{4/5}}$ $\quad \dfrac{x^{1/3-1/3}}{y^{4/5}y^{1/5}} = \dfrac{x^{2/3}}{y} = \dfrac{\sqrt[3]{x^2}}{y}$

3. $\left(\dfrac{54^{1/4}}{27^{1/4}}\right)^2 = \left(\left(\dfrac{54}{27}\right)^{1/4}\right)^2 = 2^{1/2} = \sqrt{2}$ $\quad \left(\dfrac{a}{b}\right)^m = \dfrac{a^m}{b^m}$

$\dfrac{\sqrt[4]{54}}{\sqrt[4]{27}} = \sqrt[4]{\dfrac{54}{27}}$

4. $\left(27^{1/2}\cdot 3^{1/2}\right)^{-3}$ $\quad \left(a^m b^m\right)$

$\left((27\cdot 3)^{1/2}\right)^{-3} = \left(\sqrt{81}\right)^{-3} = 9^{-3} = \dfrac{1}{9^3} = \dfrac{1}{729}$ $\quad (ab)^m = a^m b^m$

5. $\dfrac{\sqrt[3]{9}\cdot\sqrt[4]{3}}{\sqrt[3]{3^2}} = 3^{2/3}\cdot 3^{1/4} = 3^{11/12} = \sqrt[12]{177{,}147}$

6. $\dfrac{\sqrt[5]{49}\cdot\sqrt{7}}{\sqrt[4]{49}} = \dfrac{\sqrt[5]{7^2}\cdot\sqrt[2]{7}}{\sqrt[4]{7^2}} = \dfrac{7^{2/5}\cdot 7^{1/2}}{7^{1/2}} = \sqrt[5]{7^2} = \sqrt[5]{49}$