

Rational Exponents and Radicals

Guide Notes

Rational Exponent

$$x^{\frac{m}{n}} = {}^n\sqrt{x^m}$$

Laws of Radicals

$$\left({}^n\sqrt{a}\right)^n = a, a > 0$$

$$\sqrt[n]{ab} = \sqrt[n]{a}\sqrt[n]{b}, a, b > 0$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}, a, b > 0$$

$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[mn]{a} = \sqrt[n]{\sqrt[m]{a}}$$

Sample Problem 1: Change the following expression in rational exponent to radicals.

1. $a^{\frac{3}{4}}$

2. $3^{\frac{1}{2}}$

Sample Problem 2: Change the following radicals to rational exponent.

3. $\sqrt{5}$

4. $\sqrt[4]{a^3}$

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Sample Problem 3: Simplify the following expression in rational exponent.

5. $(x^3)^{\frac{2}{3}}$

6. $(a^2b^4)^{\frac{3}{2}}$

7. $25^{\frac{3}{2}}$

8. $4^{-\frac{5}{2}}$

Sample Problem 4: Evaluate the following radicals.

9. $(\sqrt{x^3})^2$

10. $\sqrt[6]{4}$

11. $\sqrt[6]{4y^4}$

12. $\sqrt[3]{\frac{-2}{8x^6}}$