

Lesson 52 Objective: SWBAT simplify expressions with rational exponents and radicals.

Kickoff- Simplify the following and write in simplest radical form.

1)  $x^{\frac{5}{4}} \cdot x^{\frac{1}{4}}$   
 $x^{\frac{6}{4}} = x^{\frac{3}{2}} = \sqrt{x^3}$

2)  $x^3 \cdot x^{-\frac{1}{2}}$   
 $x^{\frac{6}{2}} \cdot x^{-\frac{1}{2}} = x^{\frac{5}{2}} = \sqrt{x^5}$

3)  $x^3 \cdot x^{\frac{1}{2}}$   
 $x^{\frac{6}{2}} \cdot x^{\frac{1}{2}} = x^{\frac{7}{2}} = \sqrt{x^7}$

3)  $\frac{16a^{\frac{2}{3}}}{6a^4}$   
 $\frac{8a^{-1/4}}{3} \rightarrow \frac{8}{3a^{1/4}}$   
 $\frac{8}{3\sqrt[4]{a}}$

Simplifying Radical Expressions

1)  $\sqrt[4]{16x^8}$   
 Break down your radical into perfect squares, cubes, or other root and a non-perfect.

2)  $a^{\frac{5}{2}}$   
 $a^{\frac{5}{2}} = a^2 \cdot a^{\frac{1}{2}} = a^2 \sqrt{a}$

3) Variables break down into multiples of the index and the non multiples.

3) Divide your exponent and index.

$\sqrt[4]{16x^8} \rightarrow (16x^8)^{\frac{1}{4}} = 16^{\frac{1}{4}} x^2 = 2x^2$

$\sqrt{150} = \sqrt{25 \cdot 6} = 5\sqrt{6}$

$\sqrt[6]{a^7} = \sqrt[6]{a^6 \cdot a} = \sqrt[6]{a^6} \cdot \sqrt[6]{a} = a \sqrt[6]{a}$

1)  $\sqrt{80x^2}$   
 $\sqrt{16x^2 \cdot 5} \rightarrow 4x\sqrt{5}$

2)  $\sqrt[3]{108b^4}$   
 $\sqrt[3]{27b^3 \cdot 4b} = 3b\sqrt[3]{4b}$

3)  $\sqrt[4]{80k^5}$   
 $\sqrt[4]{16 \cdot 5k^4}$   
 $2\sqrt[4]{5k^2}$

4)  $\sqrt[4]{162a^6}$   
 $\sqrt[4]{81a^4 \cdot 2a^2}$   
 $3a\sqrt[4]{2a^2}$

6)  $10\sqrt{x}$

7)  $2n\sqrt[3]{3n}$

8)  $3\sqrt[4]{3x}$

13)  $-4b\sqrt[3]{3a}$

12)  $104\sqrt{x}$

17)  $-5\sqrt{105y}$

20)  $-3a\sqrt[3]{40a^2}$