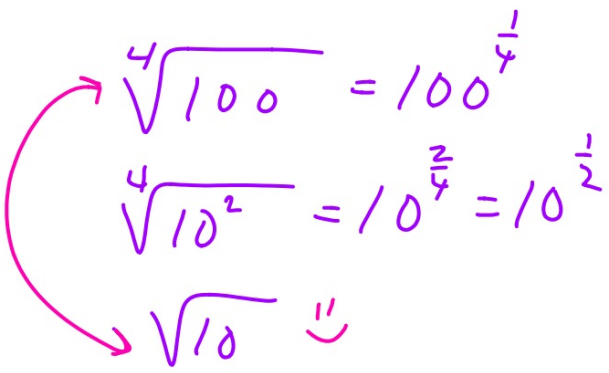
Algebra 2 6.6

Write expressions with rational exponents in radical form and vice versa

Simplify expressions in exponential and radical form

radical form
rational exponents
Quiz Thurs. 6.5-6.6
whiteboards



$b^{\frac{1}{2}} = \sqrt{b}.$

CCSS PRECISION Simplify each expression.

10. $a^{\frac{3}{4}} \cdot a^{\frac{1}{2}}$

$\frac{3}{4} + \frac{1}{2} = \frac{3+2}{4}$

a

$a^{\frac{5}{4}}$

11. $\dfrac{x^{\frac{4}{5}}}{x^{\frac{1}{5}}}$

$\frac{4}{5} - \frac{1}{5}$

x

$x^{\frac{3}{5}}$

12. $\frac{b^3}{c^{\frac{1}{2}}} \cdot \frac{c^1}{b^{\frac{1}{3}}}$

$$\frac{b^3 c^1}{b^{\frac{1}{3}} c^{\frac{1}{2}}}$$

$b^{3-\frac{1}{3}} c^{1-\frac{1}{2}}$

$b^{\frac{8}{3}} c^{\frac{1}{2}}$

$b^{\frac{8}{3}} c^{\frac{1}{2}}$

13. $\sqrt[4]{9g^2}$

$3^{\frac{2}{4}} \quad 9^{\frac{2}{4}}$

$3^{\frac{1}{2}} \quad 9^{\frac{1}{2}}$

$\sqrt{3g}$

14. $\frac{\sqrt[5]{64}}{\sqrt[5]{4}}$

$\frac{2^{\frac{6}{5}}}{2^{\frac{2}{5}}} \quad 2^{\frac{6}{5}-\frac{2}{5}} = 2^{\frac{4}{5}}$

$\sqrt[5]{2^4} = \sqrt[5]{16}$

New today...Try writing in radical form:

15. $\dfrac{g^{\frac{1}{3}} - 1}{g^{\frac{1}{2}} + 1}$

$$\frac{\left(\sqrt{g}-1\right)}{\left(\sqrt{g}+1\right)}\cdot\frac{\left(\sqrt{g}-1\right)}{\left(\sqrt{g}-1\right)} \qquad \frac{g+1-2\sqrt{g}}{g-1}$$

$$\frac{\dfrac{\sqrt{g}-1}{\sqrt{g}-1}}{\dfrac{-\sqrt{g}+1}{g-\sqrt{g}}} \qquad \frac{\sqrt{g}+1}{\dfrac{\sqrt{g}-1}{g\sqrt{g}-1}}$$

$-27^{\frac{2}{3}}$ $-1 \cdot 27^{\frac{2}{3}}$

ConceptSummary Expressions with Rational Exponents

An expression with rational exponents is simplified when all of the following conditions are met.

- It has no negative exponents.
- It has no exponents that are not positive integers in the denominator.
- It is not a complex fraction.
- The index of any remaining radical is the least number possible.

$x^{\frac{6}{10}}$ $x^{\frac{3}{5}}$ $\sqrt[5]{x^3}$

$(-256)^{\frac{2}{4}}$

$-1 \cdot 256$

$-1\sqrt[4]{256^3}$

$-1 \cdot 4^3 = -64$

Final answer is in same form as original problem:
radical>>>radical
fractional exponents>>>fractional exponents

$-27^{\frac{2}{3}}$

$-1 \cdot 27^{\frac{2}{3}}$

$-1 \cdot \sqrt[3]{27^2}$

$-1 \cdot 3 \cdot 3$

-9

$(-27)^{\frac{2}{3}}$

$\sqrt[3]{-27}^{\,2}$

$-3 \cdot -3$

9

$$\frac{g^{\frac{3}{5}+\frac{1}{2}}-1}{g^{\frac{1}{2}}+1}\cdot\frac{\sqrt[5]{g^3}-1}{\sqrt{g}+1}\cdot\left(\frac{\sqrt{g}-1}{\sqrt{g}-1}\right)=\frac{g^{\frac{11}{10}}-g^{\frac{3}{5}}-g^{\frac{1}{2}}+1}{g-1}$$

$$\frac{g^{\frac{11}{10}}-1}{g^{\frac{1}{2}}-1}\cdot\frac{\sqrt{g}+1}{\sqrt{g}-1}$$

$$\frac{g^{\frac{11}{10}}-g^{\frac{3}{5}}-g^{\frac{1}{2}}+1}{g-1}$$

$$\left(\frac{125}{216}\right)^{\frac{2}{3}} \quad \frac{\sqrt[3]{125^2}}{\sqrt[3]{216^2}} = \frac{25}{36}$$

$$\left(n^{\frac{3}{1}}\right)^{\frac{2}{5}} \quad n^{\frac{6}{5}}$$

$$\left(u^{\frac{1}{3}}\right)^{\frac{4}{5}} \quad u = ^{\frac{4}{15}}$$

$$\left(x^2\right)^3 = x^6$$