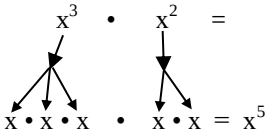
Sec 1.3 –Revisiting Quadratics
Rational Exponents and Radicals Name:

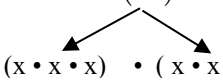
Rules of Exponents

$x^3 \cdot x^2 =$



$x \cdot x \cdot x \cdot x \cdot x = x^5$

$(x^3)^2 =$



$(x \cdot x \cdot x) \cdot (x \cdot x \cdot x) = x^6$

$$\frac{x^7}{x^4} = \frac{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x \cdot x} = x^3$$

$$\frac{y^2 x^{-3} z^5}{y^{-4} x^6 z^7} = \frac{y^2 x^{-3} z^5}{y^{-4}\, x^6 z^7} = \frac{y^4 y^2 z^5}{x^3 x^6 z^7} =$$

$$\frac{y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot z \cdot z \cdot z \cdot z \cdot z \cdot z}{x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot z \cdot z \cdot z \cdot z \cdot z \cdot z \cdot z}$$

$$\frac{y^6}{x^9 \cdot z^2}$$

$$a^{\frac{3}{4}} = \sqrt[4]{a^3} \quad or \quad \left(\sqrt[4]{a}\right)^3$$

1. Rewrite the following **rational exponents** in $\sqrt{\textbf{\textit{radical form}}}$ and simplify if possible. *(provide an approximate answer when possible).*

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

b. $48^{\frac{2}{3}}$

decimal approximation:

c. $(32x)^{\frac{3}{4}}$

d. $27^{-\frac{4}{3}}$

2. First, simplify the **rational exponents** using rules of exponents and then rewrite the final answer in $\sqrt{\textbf{\textit{radical form}}}$.

a. $x^{\frac{1}{5}} \cdot x^{\frac{3}{5}}$

b. $\dfrac{a^{\frac{5}{3}}}{a^{\frac{1}{3}}}$

c. $\dfrac{m^{\frac{2}{3}} \cdot m^{-\frac{1}{2}}}{m^{\frac{1}{6}}}$

3. First, simplify the **rational exponents** using rules of exponents and then rewrite the final answer in $\sqrt{\textbf{\textit{radical form}}}$.

a. $\left(b^{\frac{1}{4}}\right)^{4}$

b. $\left(p^{\frac{3}{4}}\right)^{\frac{2}{5}}$

c. $\left(\dfrac{w^{\frac{1}{6}}}{w^{-\frac{2}{3}}}\right)^{2}$

4. Using your calculator approximate the following to the nearest hundredth.

a. $32^{\frac{3}{5}}$

b. $\sqrt[4]{54}$

c. $\left(12^{\frac{1}{4}}\right)^{\frac{2}{3}}$

d. $\sqrt[4]{8^{\frac{2}{3}}}$

e. $\left(\frac{243}{32}\right)^{-\frac{2}{5}}$

6. Rewrite the following $\sqrt{\textbf{\textit{radicals}}}$ using **rational exponents.**

a. $\sqrt[9]{p^{3}}$

b. $\left(\sqrt[4]{5a}\right)^{3}$

c. $\sqrt[5]{(2x)^{10}}$

d. $\sqrt[3]{27x^{4}y^{6}}$

6. Rewrite the following using fractional exponents and simplify when possible:

a. $\sqrt[6]{x^{4}}+\sqrt[3]{x^{6}}$

b. $\sqrt[6]{h^{2}}\cdot\sqrt[3]{h}$

c. $\dfrac{\sqrt{x}}{x^{3}}$

d. $\dfrac{\sqrt[3]{p^{5}}}{p\cdot\sqrt[3]{p}}$