# Section 5-7 (page 296)

Rational Exponents – means exponents that may be written as a ratio aka a <u>fraction</u>.

* New Idea $\sqrt[n]{b^m}$ same as $b^{\frac{m}{n}}$

- The exponent is the numerator
- The root's index is the denominator

examples: $\sqrt{2} = 2^{\frac{1}{2}}$

$\sqrt[3]{x^2} = x^{\frac{2}{3}}$

$\sqrt[4]{y^8} = y^{\frac{8}{4}} = y^2$

# Guidelines – things to remember to simplify:

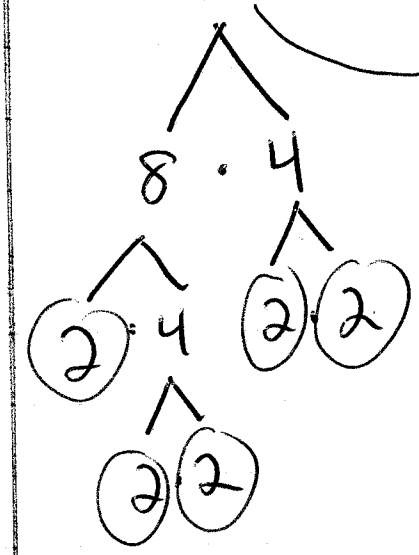
- Break down radicals to smallest base ex.) $\sqrt[5]{32} \rightarrow \sqrt[5]{2^5} \rightarrow 2$
- Can't use negative exponents in answer.
- Can't leave roots or Fractional exponents in Denominator.

Ex 2 a) $81^{\ominus\frac{1}{4}} = \frac{1}{81^{\frac{1}{4}}} = \frac{1}{(3^4)^{\frac{1}{4}}}$

$\frac{1}{\sqrt[4]{81}}$ → $\frac{1}{\sqrt[4]{(3)^4}}$ → $\frac{1}{3}$

$\frac{1}{3^1}$ → $\frac{1}{3}$

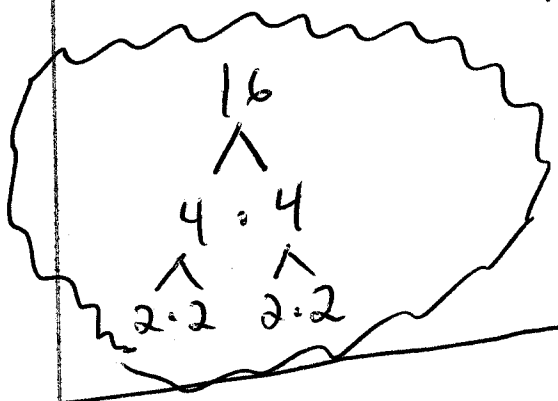
b. $(32)^{3/5} = (2^5)^{3/5} = 2^{15/5} = 2^3 = 8$




Ex 3 a $x^{2/3} \cdot x^{5/3} = x^{7/3}$

b. $y^{-5/6} = \frac{1}{y^{5/6}} \cdot \frac{y^{1/6}}{y^{1/6}} = \frac{y^{1/6}}{y}$

ex: 4 a.) $\dfrac{\sqrt[8]{16}}{\sqrt[6]{2}} = \dfrac{16^{\frac{1}{8}}}{2^{\frac{1}{6}}} = \dfrac{(2^4)^{\frac{1}{8}}}{2^{\frac{1}{6}}}$




$= \dfrac{2^{\frac{1}{2}}}{2^{\frac{1}{6}}}$

$= 2^{(\frac{1}{2}-\frac{1}{6})}$

$= 2^{(\frac{3}{6}-\frac{1}{6})} = 2^{\frac{2}{6}}$

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

OR

$\sqrt[3]{2}$

b.) $\sqrt[4]{4n^2}$

$(4n^2)^{\frac{1}{4}} = 4^{\frac{1}{4}} \cdot n^{\frac{1}{2}}$

$\downarrow$

$(2^2)^{\frac{1}{4}} \cdot n^{\frac{1}{2}}$

$2^{\frac{1}{2}} \cdot n^{\frac{1}{2}}$

OR

$\sqrt{2} \cdot \sqrt{n} = \sqrt{2n}$

(c.) $$\frac{a^{\frac{1}{2}}+1}{a^{\frac{1}{2}}-1} \cdot \frac{a^{\frac{1}{2}}+1}{a^{\frac{1}{2}}+1}$$

$$= \frac{a + a^{\frac{1}{2}} + a^{\frac{1}{2}} + 1}{a-1}$$

$$= \frac{a + 2a^{\frac{1}{2}} + 1}{a-1}$$

Try p. 300 # 7 - 35 ODD