

The "7th" Exponent Rule

Ch. 6-2 RATIONAL Exponents

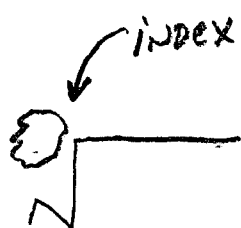
\uparrow
RATIO = fractions
 \Rightarrow FRACTIONAL Exponent Rule
FER

$$\text{FER } a^{\frac{m}{n}} = \sqrt[n]{a^m} \quad \text{OR} \quad \left[\sqrt[n]{a} \right]^m$$

(EX) $4^{\frac{1}{2}} = \sqrt[2]{4} = \sqrt{4} = 2$

(EX) $16^{\frac{3}{4}} = \left[\sqrt[4]{16} \right]^3$
 \downarrow
 $= \left[\sqrt[4]{2 \cdot 2 \cdot 2 \cdot 2} \right]^3$
 \Downarrow
 $= 2^3 = \boxed{8}$

$$\begin{array}{ccc} \sqrt[3]{8} & = & 8^{\frac{1}{3}} \\ \uparrow & & \uparrow \\ \text{RADICAL FORM} & & \text{FRACTIONAL EXPONENT FORM} \end{array}$$



RADICAL SYMBOL

If index is 2, it is usually not shown

⊙ EX $\sqrt{4} = 2$ because $2 \cdot 2 = 4$

⊙ EX $\sqrt[3]{8} = 2$ because $2 \cdot 2 \cdot 2 = 8$

⊙ EX $\sqrt[4]{81} = 3$ because $3 \cdot 3 \cdot 3 \cdot 3 = 81$

EX Pg. 398 - 400

1 (A) $125^{\frac{1}{3}}$

(B) $64^{\frac{1}{6}} + 25^{\frac{1}{2}}$

2 (A) $216^{\frac{2}{3}}$

(B) $32^{\frac{4}{5}}$

3 $C = 72m^{\frac{3}{4}}$ Find C if $m = 16$

4 (A) $\sqrt[3]{x^9 y^3}$

Fractional Exponents Rule!

(B) $(x^2 y^{\frac{1}{2}})^4 \sqrt[3]{y^3}$

4A $\sqrt[4]{x^4 y^{12}}$

4B $\frac{(xy^{\frac{1}{2}})^2}{\sqrt[5]{x^5}}$

(EX) $\sqrt{16} = 16^{\frac{1}{2}}$

$\sqrt[3]{16} = 16^{\frac{1}{3}} \Rightarrow (2^4)^{\frac{1}{3}} = 2^{\frac{4}{3}}$

$\sqrt[3]{24} = 2^{\frac{4}{3}}$

(EX) Pg 398-400

① (A) $125^{\frac{1}{3}} = \sqrt[3]{125} = \boxed{5}$

② (B) $64^{\frac{1}{6}} + 25^{\frac{1}{2}}$

$\sqrt[6]{64} + \sqrt{25}$

$2 + 5 = \boxed{7}$

② (A)

$216^{\frac{2}{3}}$

$(\sqrt[3]{216})^2$ or $\sqrt[3]{216^2}$

$(6)^2 = \boxed{36}$

③ (B)

$32^{\frac{4}{5}}$

$(\sqrt[5]{32})^4$

$(2)^4 = \boxed{16}$

$$\textcircled{3.} \quad C = 72m^{\frac{3}{4}} \quad \text{Find C if } m = 16$$

$$C = 72(16^{\frac{3}{4}})$$

$$\left(\sqrt[4]{16}\right)^3$$

$$(2)^3 = 8$$

$$C = 72(8)$$

$$\boxed{C = 576}$$

$\textcircled{4A}$

$$\sqrt[3]{x^9 y^3}$$

$$\sqrt[3]{x^9} \cdot \sqrt[3]{y^3}$$

$$x^{\frac{9}{3}} \cdot y^{\frac{3}{3}}$$

$$x^3 \cdot y$$

$$= \boxed{x^3 y}$$

\textcircled{Ex}

$$\sqrt[4]{x^4 y^{12}}$$

$$\sqrt[4]{x^4} \cdot \sqrt[4]{y^{12}}$$

$$x^{\frac{4}{4}} \cdot y^{\frac{12}{4}}$$

$$\boxed{x y^3}$$

(13)

$$\frac{(xy^{\frac{1}{2}})^2}{\sqrt[5]{x^5}} = \frac{x^2 y}{x^{\frac{5}{5}}} = \frac{x^2 y}{x} = \boxed{xy}$$
