

Exponents and Radicals.

Thursday, January 25, 2018 1:00 PM

$$X^4 = X \cdot X \cdot X \cdot X$$

$$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$$

$$\left(\frac{2}{3}\right)^7 = \frac{2^7}{3^7} = \frac{128}{2187}$$

$$\begin{aligned}(3X)^4 &= 3^4 \cdot X^4 \\ &= 81X^4\end{aligned}$$

$$\begin{aligned}(4X^3)^2 &= 4 \cdot 4 \cdot X^3 \cdot X^3 \\ &= 16X^6\end{aligned}$$

$$(4X^3)^7 = 16,384 X^{21}$$

Know:

$$2^6 = 64$$

$$4^3 = 64$$

$$2^3 = 8$$

$$8^2 = 64$$

$$\begin{aligned}(2x^7)^3 &= 2^3 \cdot x^7 \cdot x^7 \cdot x^7 \\ &= 8x^{21}\end{aligned}$$

Know:

$$x^0 = 1$$

$$5^0 = 1 \quad (-7)^0 = 1$$

old.

$$\frac{x^5}{x^3} = x^2$$

subtract
exponents.

$$\begin{aligned}\frac{x^5}{x^5} &= 1 \\ \Rightarrow x^{5-5} &= x^0 \\ &x \neq 0\end{aligned}$$

$$X^3 \cdot X^4 = X^7 \quad \text{add exponents}$$

Confuse >

$$(X^3)^4 = X^{12} \quad \text{multiply exponents.}$$

$$\begin{array}{r} (X^3)^4 \cdot X^3 \\ \hline X^{12} \cdot X^3 \\ X^{15} \end{array}$$

$$\left(\frac{a^2}{b^4} \right)^{10} = \frac{a^{20}}{b^{40}}$$

$$X^{-3} = \frac{1}{X^3}$$



$$X^{-3}$$

$$\frac{x^{-3}}{1} \text{ move to other place in fraction}$$

$$\Downarrow$$
$$\boxed{\frac{1}{x^3}}$$

$$\frac{x^{-4}}{b^{-7}} = \frac{b^7}{x^4}$$

$$\frac{3a^{-7}b^4}{b^{-3}a^{10}} = \frac{3b^4b^3}{a^7a^{10}}$$
$$= \frac{3b^7}{a^{17}}$$

Radicals

$$\begin{aligned}\sqrt{12} &= \sqrt{4 \cdot 3} \\ &= 2\sqrt{3}\end{aligned}$$

$$\begin{aligned}4 &= 2^2 \\ \sqrt{4} &= \sqrt{2^2}\end{aligned}$$

$$\begin{aligned}\sqrt{75} &= \sqrt{25 \cdot 3} \\ &= 5\sqrt{3}\end{aligned}$$

$$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 \cdot 5 \cdot 3 \cdot 3}$$

$$2 \cdot 2 \cdot 5 \cdot 3 \sqrt{5}$$

$$60\sqrt{5}$$

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

$$\begin{aligned}\sqrt[5]{64} &= \sqrt[5]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} \\ &= 2\sqrt[5]{2}\end{aligned}$$

$$2^3 = 8$$
$$2^4 = 16$$

$$2^5 = 32$$

$$2^6 = 64$$

$$\longrightarrow 4^3 = 64 \longrightarrow 8^2 = 64$$

$$\begin{aligned} \sqrt[5]{64} &= (64)^{1/5} \\ &= (32 \cdot 2)^{1/5} \\ &= (2^5 \cdot 2)^{1/5} \\ &= (2^5)^{1/5} \cdot 2^{1/5} \\ &= 2 \cdot \sqrt[5]{2} \end{aligned}$$

$\sqrt[5]{\underbrace{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} \cdot 2}$
 $2 \cdot \sqrt[5]{2}$

$$\sqrt{16a^{10}}$$

$4a^5$

Prime Factor

$$\begin{array}{r} 2 \overline{) 96} \\ \underline{2} \\ 2 \end{array}$$

$$\begin{array}{r} 2 \overline{) 48} \\ \underline{2} \\ 2 \end{array}$$

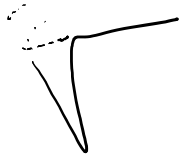
$$\sqrt{96} = 2 \cdot 2 \cdot \sqrt{2 \cdot 3}$$

$$= 4\sqrt{6}$$

$$\begin{array}{r} 2 \overline{) 48} \\ \underline{24} \\ 2 \overline{) 24} \\ \underline{12} \\ 2 \overline{) 12} \\ \underline{6} \\ 2 \overline{) 6} \\ \underline{3} \\ 3 \overline{) 3} \\ \underline{1} \end{array}$$

$$\sqrt{75} = 5\sqrt{3}$$

$$\begin{array}{r} 3 \overline{) 75} \\ \underline{50} \\ 5 \overline{) 25} \\ \underline{5} \\ 5 \overline{) 5} \\ \underline{1} \end{array}$$



$$\sqrt{24} = 2\sqrt{6}$$

$$\begin{array}{r} 2 \overline{) 24} \\ \underline{12} \\ 2 \overline{) 12} \\ \underline{6} \\ 2 \overline{) 6} \\ \underline{3} \\ 3 \overline{) 3} \\ \underline{1} \end{array}$$

$$\sqrt[3]{16x^5}$$

three of them

$$\begin{array}{r} 2 \overline{) 16} \\ \underline{8} \\ 2 \overline{) 8} \\ \underline{4} \\ 2 \overline{) 4} \\ \underline{2} \\ 2 \overline{) 2} \end{array} \quad \begin{array}{c} X \\ X \\ X \\ X \end{array}$$

$$\sqrt{16x}$$

three
of
them

$$\begin{array}{r} 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \overline{) 2} \\ \hline 1 \end{array}$$

$$\begin{array}{c} (x) \\ x \\ x \\ x \\ x \end{array}$$

$$2 \cdot x \sqrt[3]{2x^2}$$

$$\sqrt[3]{x^{17}}$$

$$\sqrt[3]{x^{15} \cdot x^2}$$

$$x^5 \sqrt[3]{x^2}$$

$$\sqrt[5]{32 a^{40}}$$

$$\begin{array}{r} 2 \overline{) 32} \\ 2 \overline{) 16} \\ 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \overline{) 2} \\ \hline 1 \end{array}$$

$$\sqrt[5]{32}$$

$$\sqrt[5]{a^{40}}$$

$$2 \quad a^8$$

$$(32 a^{40})^{2/5}$$

$$\left(\sqrt[5]{32 a^{40}} \right)^2$$

$$(2a^8)^2$$

$4a^{16}$

$$\sqrt[5]{a^7} = a^1 \sqrt[5]{a^2}$$

$$\sqrt[3]{x^{10}} = x^3 \sqrt[3]{x^1}$$