

BE-Precalc Tuesday 11-10-09

Simplify:

① $x^{\frac{2}{3}} \cdot x^{\frac{1}{3}}$

② $16^{\frac{3}{4}}$

③ $(81^{\frac{1}{2}})^{\frac{1}{2}}$

④ $\sqrt{72}$

⑤ $\sqrt{6} \cdot \sqrt{10}$

⑥ 8^{-2}

⑦ $\frac{1}{5^{-2}}$

$$\sqrt{x} = \sqrt{x}$$

$$\sqrt{x^2} = x \Rightarrow \text{Really } \sqrt[n]{x^2} = |x| = \pm x$$

$\uparrow$ $\uparrow$
 ALWAYS $\oplus$ ALWAYS $\oplus$
 INDEX

"EI EI 00" $\Rightarrow$ USE ABSOLUTE VALUE

EVEN EVEN
 INDEX EXPONENT INSIDE
 ODD EXPONENT OUTSIDE

$$* \sqrt{x^3} = \sqrt{x^2} \sqrt{x} = x \sqrt{x}$$

$$\sqrt{x^4} = \sqrt{x^2} \sqrt{x^2} = x x = x^2$$

$$* \sqrt{x^5} = \sqrt{x^4} \sqrt{x} = x^2 \sqrt{x}$$

$$\sqrt{x^6} = \sqrt{x^3} \sqrt{x^3} = |x^3|$$

EI EI 00

$$* \sqrt{x^7} = \sqrt{x^6} \sqrt{x} = x^3 \sqrt{x}$$

$$\sqrt{x^8} = x^4$$

$$\sqrt{x^9} = \sqrt{x^8} \sqrt{x} = x^4 \sqrt{x}$$

$$\sqrt{x^{10}} = |x^5|$$

EI EI 00

Ch. 11-1 Real Exponents

EX 4
pg 697 (A) $125^{\frac{1}{3}} = \sqrt[3]{125} = \boxed{5}$

or $(125)^{\frac{1}{3}} = (5^3)^{\frac{1}{3}} = 5^{\frac{3}{3}} = \boxed{5^1} \checkmark$

Recognize THIS
is 5^3

(B) $\sqrt{14} \cdot \sqrt{7} = \sqrt{98} = \sqrt{49 \cdot 2} = \boxed{7\sqrt{2}}$

49 2

OR $\sqrt{7} \cdot \sqrt{2} \cdot \sqrt{7} = \boxed{7\sqrt{2}}$

OR $7^{\frac{1}{2}} \cdot 2^{\frac{1}{2}} \cdot 7^{\frac{1}{2}} = 2^{\frac{1}{2}} 7^{\frac{1}{2}} 7^{\frac{1}{2}}$

$2^{\frac{1}{2}} \cdot 7 = \boxed{7\sqrt{2}} \checkmark$

EX 5 $(81c^4)^{\frac{1}{4}} = \sqrt[4]{81c^4} = \boxed{3|c|}$

0018100

OR $81^{\frac{1}{4}} c^{\frac{4}{4}}$

$= (3^4)^{\frac{1}{4}} c^1$

$3^1 c^1$

NOTE: $\sqrt{x^2} = |x|$
 $x = \pm x$

Ex 6
Pg 698

(A) $625^{\frac{3}{4}}$

$$\sqrt[4]{625^3} = \left(\sqrt[4]{625}\right)^3 \quad \text{MUCH EASIER}$$

$$= (5)^3 = \boxed{125}$$

Ex 7 (A)

$$\sqrt[3]{64s^9t^{15}} = \boxed{4s^3t^5}$$

$\begin{array}{ccc} \wedge & \wedge & \wedge \\ 4 & 4 & 4 \\ 444 & 111 & 555 \\ s^3s^3s^3 & t^5t^5t^5 & \end{array}$

OR $64^{\frac{1}{3}}(s^9)^{\frac{1}{3}}(t^{15})^{\frac{1}{3}} = 4s^{\frac{9}{3}}t^{\frac{15}{3}}$

$$= \boxed{4s^3t^5} \checkmark$$

Ex 8
Pg 699

$$\sqrt{r^7s^{25}t^3} = \boxed{r^3s^{12}t\sqrt{rst}}$$

$\begin{array}{ccc} \wedge & \wedge & \wedge \\ r^6 & 24s & t^2 \\ \hline \end{array}$

NOT EIEIOO - NO! BOOK SAYS YES

* Solve
Ex 9

$$734 = x^{\frac{3}{4}} + 5$$

$$729 = x^{\frac{3}{4}}$$

$$729^{\frac{4}{3}} = \left(x^{\frac{3}{4}}\right)^{\frac{4}{3}}$$

Raise each side to to $\frac{4}{3}$ power, why?

$$\boxed{729^{\frac{4}{3}} = x}$$

NO CALCULATOR

∴ $x = \left(\sqrt[3]{729}\right)^4 = \boxed{6561}$

CALCULATOR

Homework: Pg 700 #4-17 Pg 701 #65-66