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(7.2 Rational exponents (Cont'd)
Lect Notes p 118)

Part C) use radical notation to rewrite. Simplify

Ex: $(16x^4)^{\frac{1}{4}}$

$= \sqrt{16x^4} = \sqrt{2\cdot 2\cdot 2\cdot 2\cdot x\cdot x\cdot x\cdot x} = 2\cdot 2\cdot x\cdot x$

$= 4x^2$ final answer.

* Rule. $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$

~~#21 Ex)~~ use radical notation to rewrite simplify.
$x > 0$

#21 Ex) $(5x+3)^{\frac{4}{5}} = \sqrt[5]{(5x+3)^4} = (\sqrt[5]{15x+3})^4$

#19 Ex) use radical notation simplify. check with calculator.

$(-81)^{\frac{3}{4}} = (\underbrace{\sqrt[4]{-81}}_{\text{not a real number}})^3$

#20 Ex) Radical notation. Simplify. $x > 0$

$(3x)^{\frac{3}{5}} = (\sqrt[5]{3x})^3$ or $\sqrt[5]{3x^3}$ {Both ways are correct}

Ex) $a^n = \frac{1}{a^n} = a^{-\boxed{\frac{m}{n}}} = \frac{1}{a^{\boxed{\frac{m}{n}}}}$

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~~#1# Ex~~) use radical notation to rewrite simplify.

$x>0$

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$(3x)^{\frac{3}{5}} = (\sqrt[5]{3x})^3$ or $\sqrt[5]{3x^3}$ {Both ways are correct}

Ex) $a^n = \frac{1}{a^n} = a^{-\frac{m}{n}} = \frac{1}{a^{\frac{m}{n}}}$

#24) $(-8)^{-\frac{2}{3}} = \frac{1}{(-8)^{\frac{2}{3}}}$

Side note: Notice! the exponent changed signs, but the base did not!

$= \frac{1}{(\sqrt[3]{-8})^2} = \frac{1}{(-2)^2} = \boxed{\frac{1}{4}}$ final answer:

→ Second Half of 7.2

★ Using Rules for exponents to simplify Expressions containing Rational exponents

#33) Use prop's of exponents to simplify write w/ positive exponents. $u > 0$

$(16u^2)^{\frac{3}{2}} = 16^{\frac{3}{2}} \cdot (u^2)^{\frac{3}{2}} = 64 \cdot u^3 = \boxed{64u^3}$ final answer

#38) $\frac{(x^3y^2)^{\frac{1}{6}}}{(x^{-7}y^{-1})^{-\frac{1}{3}}} = \frac{(x^3)^{\frac{1}{6}}(y^2)^{\frac{1}{6}}}{(x^{-7})^{-\frac{1}{3}}(y^{-1})^{-\frac{1}{3}}} \overset{\text{Rule}}{\Rightarrow} \frac{x^{\frac{1}{2}}y^{\frac{1}{3}}}{x^{\frac{7}{3}}y^{\frac{1}{3}}} = \frac{x^{\frac{1}{2}}}{x^{\frac{7}{3}}} \overset{\text{Rule 2}}{\Rightarrow}$

$= x^{\frac{3}{3}\cdot\frac{1}{2} - \frac{7}{3}\cdot\frac{2}{2}} = x^{\frac{3}{6} - \frac{14}{6}} = x^{-11/6} \overset{\text{Rule \#6}}{\Rightarrow} \boxed{\frac{1}{x^{11/6}}}$

★ 7.3 Simplifying Radical expressions

#12) use product and/or Quotient **Rule**

$\sqrt[6]{2} \cdot \sqrt[6]{5x} \overset{\text{Product Rule}}{=\!=\!=} \sqrt[6]{2 \cdot 5x} = \boxed{\sqrt[6]{10x}}$ final answer.

Part B) $\sqrt{\frac{13m^2}{4m^2}}$ $\overset{\text{quotient rule}}{=}$ $\frac{\sqrt{13m^2}}{\sqrt{4m^2}} = \frac{\sqrt{13 \cdot m \cdot m}}{\sqrt{2 \cdot 2 \cdot m \cdot m}}$

$= \boxed{\frac{m\sqrt{13}}{2m}}$ final answer

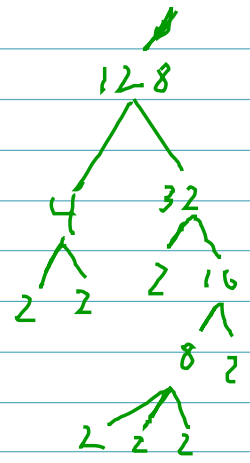
Prob #29) $\sqrt[3]{128x^3} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x}$

$= 2 \cdot 2 \cdot x \cdot \sqrt[3]{2} = 4x \cdot \sqrt[3]{2}$

$\boxed{= 4x\sqrt[3]{2}}$

Wrong always and always use the multiplication dot!!!!

side note:



$\boxed{4x \cdot \sqrt[3]{2}}$ final answer

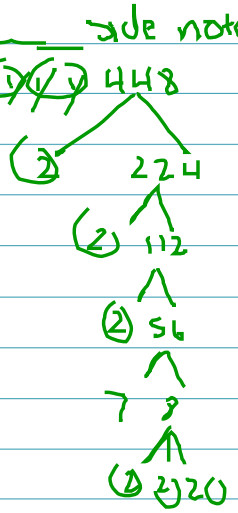
#35) Simplify $x>0,\ y>0$

$-\sqrt{448x^6y^{15}} = -\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 7 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y}$

$y \cdot y$ 4 times

$= -8x^3y^7\sqrt{7y}$

side note:



#33) $\sqrt[5]{-243x^5y^3}$

odd index of a negative

$= -\sqrt[5]{243x^5y^3} = -\sqrt[5]{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y}$

$= \boxed{-3x \cdot \sqrt[5]{y^3}}$

final answer