

June 10, 2015

8.1 Example #9

$$\frac{(x^{\frac{1}{2}} \cdot x^{\frac{1}{3}})^{-\frac{3}{2}}}{x^{\frac{1}{6}}} = \left(\frac{x^{\frac{5}{6}}}{x^{\frac{1}{6}}}\right)^{-\frac{3}{2}}$$

$$= \left(x^{\frac{5}{6} - \frac{1}{6}}\right)^{-\frac{3}{2}}$$

$$= \left(x^{\frac{4}{6}}\right)^{-\frac{3}{2}}$$

$$= \frac{x^{\frac{4}{6}}}{x^{\frac{3}{2}}}$$

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

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

$$= \frac{1}{x^{\frac{9}{6} - \frac{4}{6}}}$$

$$= \frac{1}{x^{\frac{5}{6}}}$$

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8.1 #14

$$\left(\frac{49c^{\frac{2}{3}}}{a^{-\frac{1}{4}}b^{\frac{5}{6}}}\right)^{-\frac{3}{2}} = \left(\frac{49c^{\frac{2}{3}}a^{\frac{1}{4}}}{b^{\frac{5}{6}}}\right)^{-\frac{3}{2}}$$

$$= 49^{-\frac{3}{2}} \cdot (c^{\frac{2}{3}})^{\frac{3}{2}} \cdot (a^{\frac{1}{4}})^{\frac{3}{2}} \cdot (b^{\frac{5}{6}})^{\frac{3}{2}}$$

$$= \frac{49^{-\frac{3}{2}} \cdot c^{\frac{2}{3} \cdot \frac{3}{2}} \cdot a^{\frac{1}{4} \cdot \frac{3}{2}}}{b^{\frac{5}{6} \cdot \frac{3}{2}}}$$

$$= \frac{49^{-\frac{3}{2}} \cdot c^1 \cdot a^{\frac{3}{8}}}{b^{\frac{5}{4}}}$$

$$= \frac{(\sqrt{49})^3 \cdot c \cdot a^{\frac{3}{8}}}{b^{\frac{5}{4}}}$$

$$= \frac{343 a^{\frac{3}{8}} c}{b^{\frac{5}{4}}}$$

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$$\left(\frac{2}{3}\right)^3 = \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{2^3}{3^3} = \frac{8}{27}$$

or

$$= \left(\frac{2^3}{3^3}\right) = \frac{8}{27}$$

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8.1 #9

$$(-36)^{\frac{3}{2}} = \sqrt[2]{(-36)^3}$$

$$= \left(\sqrt[2]{(-36)}\right)^3 = \text{not real}$$

$$(?)^2 = -36$$

$$(6)^2 = +36$$

$$(-6)^2 = (-6) \cdot (-6) = +36$$

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8.1 #42

$$\left[\frac{(x^{\frac{1}{2}}y^{\frac{1}{3}})^{-2}}{2x^{-3}}\right]^{-3}$$

Check:

- Product Rule
- Power Rule
- Quotient Rule
- Inv. Exp/Product Rule

$$\left[\frac{x^{\frac{1}{2}(-2)}y^{\frac{1}{3}(-2)}}{2x^{-3}}\right]^{-3}$$

$$\left[\frac{x^{-1}y^{-\frac{2}{3}}}{2x^{-3}}\right]^{-3}$$

$$\left[\frac{x^{-1} \cdot (y^{-\frac{2}{3}})}{2^{-1}x^{-3}}\right]^{-3}$$

$$\left[\frac{4}{x^2y^{\frac{2}{3}}}\right]^{-3}$$

$$\frac{4^{-3}}{(x^2)^3(y^{\frac{2}{3}})^3}$$

$$\frac{x^6y^2}{64} = \frac{x^6y^2}{64}$$

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8.1 #73

$$-2x \sqrt{y^3} \sqrt[3]{2^4}$$

$$-2x y^{\frac{3}{2}} 2^{\frac{4}{3}}$$

Stop Here!

$$-2x \cdot y^{\frac{3}{2}} \cdot 2^{\frac{8}{3}}$$

$$-2x \sqrt[6]{y^9 2^8}$$

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8.2 Simplifying Radicals

$\sqrt{49}$  The Square Root of 49

① Think of a radical as being a number that when raised to the power of the index gives us the radicand. \* what is the number?

What is a radical?

7 why?  
Because  $7^2 = 7 \cdot 7 = 49$

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Square Roots

$\sqrt{0} = 0$  why  $0^2 = 0 \cdot 0 = 0$   
 $\sqrt{1} = 1$  "  $1^2 = 1 \cdot 1 = 1$

$\sqrt{2} =$  } Irrational Numbers  
 $\sqrt{3} =$  }

$\sqrt{4} = 2 \rightarrow 2^2 = 2 \cdot 2 = 4$

$\sqrt{5} =$  } Irrational Numbers  
 $\sqrt{6} =$  }  
 $\sqrt{7} =$  }  
 $\sqrt{8} =$  }

$\sqrt{9} = 3 \rightarrow 3^2 = 9$

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Approx  $\sqrt{7}$

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Perfect Roots of Variables

Square Roots

$\sqrt{x^2} = x$

$\sqrt{x \cdot x}$

How many groups of "two" x's are there? one group

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$\sqrt{x^2} = x^1$

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

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

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

$\sqrt{x^{10}} = \sqrt{\boxed{x \cdot x} \cdot \boxed{x \cdot x} \cdot \boxed{x \cdot x} \cdot \boxed{x \cdot x} \cdot \boxed{x \cdot x}}$   
 $= x^5$

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2 min # 3

on 8.1 (#1 - #30)

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$$x^2 \cdot x^4 = x^{2+4=6} = x^6$$

$$x^1 \cdot x^1 \cdot x^1 \cdot x^1 \cdot x^1 \cdot x^1 = x^6$$

$$(x^2)^4 = x^2 \cdot x^2 \cdot x^2 \cdot x^2 = x^8$$

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$$x^{-\frac{1}{2}} = \frac{1}{x^{\frac{1}{2}}}$$

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

$$\frac{x \cdot x^1}{x \cdot x \cdot x} = \frac{1}{x}$$

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