Section 7.2: cont'd

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9:31 AM

Using the laws of exponents:

What are the rules for working with fractional exponents?

→ the exact same as for integral exponents!

example: if m and n are rational numbers, then

$$a^m \cdot a^n = a^{m+n}$$

examples:

simplify:

$$\frac{27^{-2/3}}{27^{-1/3}} = \frac{27^{1/3}}{27^{2/3}} = \frac{1}{27^{1/3}} = \frac{1}{3}$$

$a^n b^n = (ab)^n$

$$8^{1/2} 2^{1/2} = (16)^{1/2} = 4$$

$$(3^{-6})^{1/3} = \left(\frac{1}{3^6}\right)^{1/3} = \frac{1}{3^2} = \frac{1}{9}$$

or $= 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

$$\left(\frac{5^4}{3^6}\right)^{-1/2} = \left(\frac{3^6}{5^4}\right)^{1/2} = \frac{3^3}{5^2} = \frac{27}{25}$$

$$\left(\frac{a^{1/2}\, b^{3/4}}{c^3}\right)^{-8} = \left(\frac{c^3}{a^{1/2}\, b^{3/4}}\right)^{8}$$

$$= \frac{c^{24}}{a^4\, b^6}$$

$$(t v^{1/3})^2 (t^2 v^{-3})^{-1/2} = \frac{(t v^{1/3})^2}{(t^2 v^{-3})^{1/2}}$$

$$= \frac{t^2 v^{2/3}}{t\, v^{-3/2}}$$

$$= t\, v^{2/3}\, v^{3/2}$$

$$= t\, v^{2/3 + 3/2}$$

$$= t\, v^{4/6 + 9/6}$$

$$= t\, v^{13/6}$$

$$\frac{(m^6 n^{-9})^{-2/3}}{(m^{12} n^{-3})^{-1/6}} = \frac{(m^{12} n^{-3})^{1/6}}{(m^6 n^{-9})^{2/3}}$$

$$= \frac{m^2 n^{-1/2}}{m^4 n^{-6}}$$

$= \dfrac{n^6}{m^2 n^{1/2}}$

$= \dfrac{n^{11/2}}{m^2}$ or $m^{-2} n^{11/2}$

Simplify:

$b^{n/2} \cdot b^{-n/3}$

$b^{n/2 - n/3}$

$b^{\frac{3n}{6} - 2n/6}$

$b^{n/6}$

$\dfrac{b^{-n/4}}{b^{-n/3}} = b^{-n/4 + n/3}$

$= b^{-\frac{3n}{12} + 4n/12}$

$= b^{n/12}$

$\left[= \sqrt[12]{b^n} \right]$

$\left(a^{3x} b^{6y}\right)^{-1/2}$

$\dfrac{1}{(a^{3x} b^{6y})^{1/2}}$

$\dfrac{1}{\quad}$

$$\frac{1}{a^{x/4}\ b^{y/2}}$$

$$\left(\frac{a^{-3/m}\ b^{6/n}}{a^{-6m}\ b^{9/n}}\right)^{-1/3}$$

$$\left(\frac{a^{-6m}\ b^{9/n}}{a^{-3/m}\ b^{6/n}}\right)^{1/3}$$

$$\frac{a^{-2m}\ b^{3/n}}{a^{-1/m}\ b^{2/n}}$$

$$a^{1/m - 2m}\ b^{1/n}$$

$$\left[= a^{\frac{m-2m^2}{m}}\ b^{1/n}\right]$$