2/25/2022

WebWork set: Complex Fractions 2

use y^2 - multiply num + denom by it

#3) $$\frac{\frac{10}{y^2} + \frac{1}{y}}{\frac{100}{y^2} - 1}$$

$$\frac{\left(\frac{10}{y^2} + \frac{1}{y}\right) \cdot y^2}{\left(\frac{100}{y^2} - 1\right) \cdot y^2} = \frac{\frac{10 \cdot \cancel{y^2}}{\cancel{y^2}} + \frac{y^{\cancel{2}\,1}}{\cancel{y}}}{\frac{100\cancel{y^2}}{\cancel{y^2}} - y^2}$$

$$= \frac{10+y}{100-y^2} = \frac{10+y}{10^2-y^2}$$

use the formula for the difference of two squares to factor the denom.

$$= \frac{\cancel{(10+y)}}{(10-y)\cancel{(10+y)}} = \boxed{\frac{1}{10-y}}$$

Add Rat Exp2

#2) $\dfrac{5a+17}{4a-12} - \dfrac{a+5}{a-3}$

LCD:
$a-3$

$4a-12$
$= 4(a-3)$

LCD
$= 4(a-3)$

$\dfrac{5a+17}{4(a-3)} - \dfrac{4(a+5)}{4(a-3)}$

$= \dfrac{5a+17-(4a+20)}{4(a-3)}$

make sure the negative applies to both terms

$= \dfrac{5a+17-4a-20}{4(a-3)}$

$= \dfrac{\overset{1}{\cancel{(a-3)}}}{4\underset{1}{\cancel{(a-3)}}} = \boxed{\dfrac{1}{4}}$

Fractional Equations

2) $\dfrac{3}{2p} - \dfrac{8}{7} + 3 = 0$

LCD:
$2 \cdot 7 \cdot p$
$= 14p$

Multiply both sides of the equation by the LCD

$$14p\left(\frac{3}{2p} - \frac{8}{7} + 3\right) = 14p \cdot 0 = 0$$

$$\begin{array}{r} 14 \\ \times\ 3 \\ \hline 42 \end{array}$$

$$\cancel{14}^{\,7}\cancel{p} \cdot \frac{3}{\cancel{2p}_{\,1}} - \cancel{14}^{\,2}p \cdot \frac{8}{\cancel{7}_{\,1}} + 14p \cdot 3 = 0$$

$$7 \cdot 3 - 2p \cdot 8 + 42p = 0$$

$$21 - 16p + 42p = 0$$

$$21 + 26p = 0$$

$$-21 \qquad -21$$

$$\frac{26p}{26} = \frac{-21}{26}$$

$$\boxed{p = -\frac{21}{26}}$$

To check this go back to the original equation + substitute it for p

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Lesson 10: Higher Roots | Rational Exponents

Square Root: The number b is a square root of a if $b^2 = a$.

The principal square root of a non-negative number a is its non-negative square root denoted $\sqrt{a}$. The negative square root of a is written $-\sqrt{a}$.

Ex $\sqrt{36} = \boxed{6}$

$\sqrt{0} = \boxed{0}$

$\sqrt{\frac{4}{49}} = \frac{\sqrt{4}}{\sqrt{49}} = \boxed{\frac{2}{7}}$

$\sqrt{0.25} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

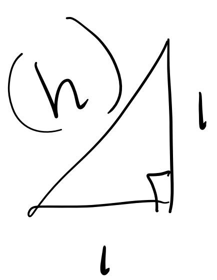
$= 0.50$

$\sqrt{x^6} \Rightarrow (x^3)^2 = x^6$

$\sqrt{9x^{10}} \Rightarrow (3x^5)^2 = 9x^{10}$

$-\sqrt{81} = -9$

$\sqrt{-81} =$ There is no real number such that $(\ )^2 = -81$



$1^2 + 1^2 = (hyp)^2$

$1 + 1 = (hyp)^2$

$\sqrt{(hyp)^2} = \sqrt{2}$

$\boxed{hyp = \sqrt{2}}$

Erastosl

"One Giant Leap"

Ex "cube root" $\sqrt[3]{8} \to (2)^3 = 8$

We can ask about "higher" or "n^{th}" roots

Finding $\sqrt[n]{a^n}$

If n is an even positive integer the $\sqrt[n]{a^n} = |a|$

If n is an odd integer Then $\sqrt[n]{a^n} = a$

Ex $\sqrt{(-3)^2} = |-3| = 3$ square root $\to$ even

absolute value

$\sqrt[3]{(-5)^3} = -5$

because $(-5)\cdot(-5)\cdot(-5)$

$= (-5)^3$

Practice: $\sqrt[5]{-243} = \quad (-3)^5 = -243$

$\sqrt[6]{64x^{12}} = \quad (2x^2)^6 = 64x^{12}$

$\sqrt{81x^4} = \quad (9x^2)^2 = 81x^4$

Rational Exponents:

$\sqrt{81} = 81^{1/2} = 9$

$\sqrt[n]{a} = a^{1/n}$

$\sqrt[n]{a^m} = a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m$

Ex $4^{3/2} = \left(4^{1/2}\right)^3 = \left(\sqrt{4}\right)^3$

$= 2^3 = 8$

$-16^{3/4} = \left((-16)^{1/4}\right)^3 = \left(\sqrt[4]{-16}\right)^3 = (-2)^3$

$(-27)^{2/3} =$ $= \boxed{-8}$

$\left((-27)^{1/3}\right)^2$

$= \left(\sqrt[3]{-27}\right)^2 = (-3)^2 = \boxed{9}$

Ex $\dfrac{a^{1/4} \cdot a^{-1/2}}{a^{2/3}}$

Reminder: Exponent Rules still apply!

$= \dfrac{a^{\frac{1}{4}+\left(-\frac{1}{2}\right)}}{a^{\frac{2}{3}}} = \dfrac{a^{\frac{1}{4}-\frac{2}{4}}}{a^{\frac{2}{3}}} = \dfrac{a^{-\frac{1}{4}}}{a^{\frac{2}{3}}}$

3 8

$$a^{-b} = \frac{1}{a^{b}}$$

$$a^{\left(-\frac{1}{4} - \frac{2}{3}\right)} = a^{-\frac{3}{12} - \frac{8}{12}}$$

$$= a^{-\frac{11}{12}} = \boxed{\frac{1}{a^{\frac{11}{12}}}}$$