Date: _____

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) simplify algebraic expressions containing rational exponents and radicals.

Last day's work: **READ p.228**

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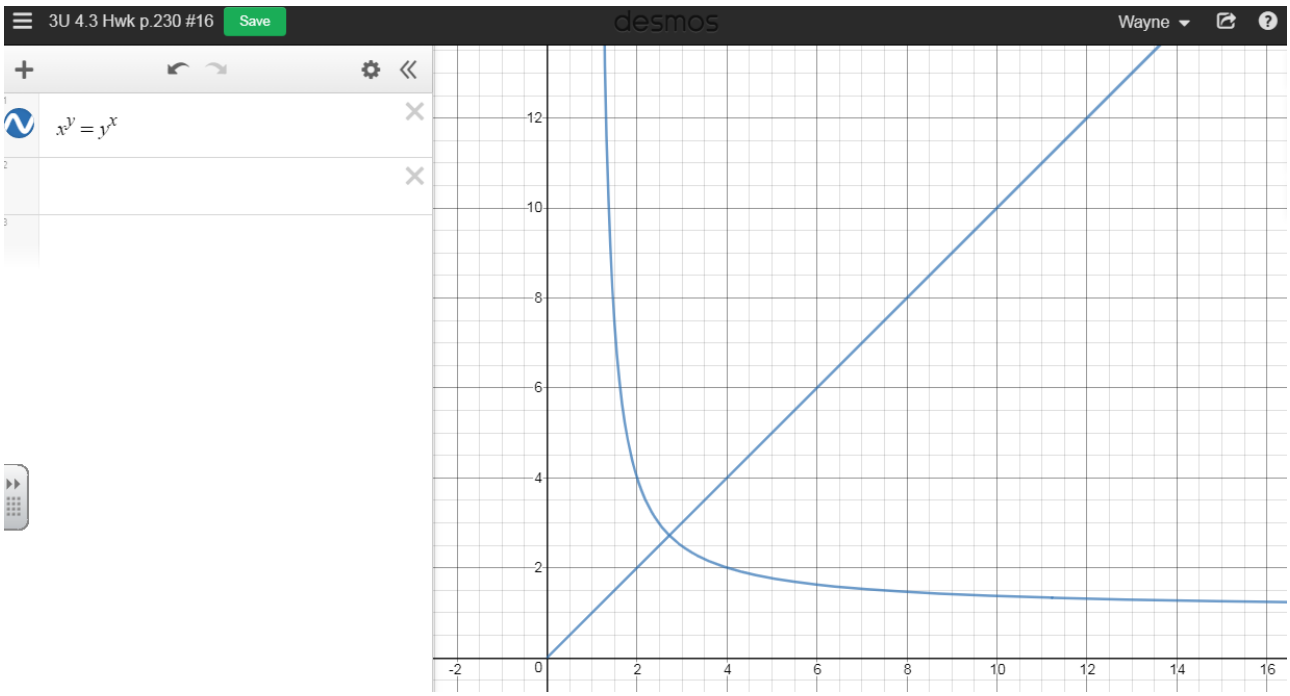
Extending

16. Given that $x^y = y^x$, what could x and y be? Is there a way to find the answer graphically?

It will always work if $x = y$

ex $x = 3 \therefore y = 3$

$3^3 = 3^3$; Using desmos



4.4 Simplifying Algebraic Expressions Involving Exponents

Date: Apr. 8/19

Ex.1 Simplify. Express answers in rational form with positive exponents.

a) $\dfrac{\left(3x^{-2}y^{2}\right)^{2}}{\left(x^{3}y^{-2}\right)^{3}}$

$= \dfrac{3^{2}(x^{-2})^{2}(y^{2})^{2}}{(x^{3})^{3}(y^{-2})^{3}}$

$= \dfrac{9x^{-4}y^{4}}{x^{9}y^{-6}}$

$= 9x^{-4-9}y^{4-(-6)}$

$= 9x^{-13}y^{10}$

$\rightarrow \dfrac{9}{1}\left(\dfrac{1}{x^{13}}\right)\dfrac{y^{10}}{1}$

$= \dfrac{9y^{10}}{x^{13}}$

Recall: $(ab)^{n} = a^{n}b^{n}$

$\dfrac{9y^{10}}{x^{13}}$

b) $\dfrac{\left(64a^{-6}b^{12}\right)^{\frac{1}{3}}}{\left(16a^{-4}b^{6}\right)^{\frac{1}{2}}}$

$= \dfrac{64^{\frac{1}{3}}(a^{-6})^{\frac{1}{3}}(b^{12})^{\frac{1}{3}}}{16^{\frac{1}{2}}(a^{-4})^{\frac{1}{2}}(b^{6})^{\frac{1}{2}}}$

$= \dfrac{\sqrt[3]{64}\,a^{-2}b^{4}}{\sqrt{16}\,a^{-2}b^{3}}$

$= \dfrac{4}{4}a^{-2-(-2)}b^{4-3}$

$= 1a^{0}b^{1}$

$= b$

c) $\dfrac{b^{-4}}{a^{-2}}$

$= \dfrac{a^{2}}{b^{4}}$

d) $\dfrac{\sqrt[6]{x^{8}}}{\sqrt[3]{x^{5}}}$

$= \dfrac{x^{\frac{8}{6}}}{x^{\frac{5}{3}}}$

$= x^{\frac{8}{6}-\frac{10}{6}}$

$= x^{-\frac{2}{6}}$

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

$= \dfrac{1}{x^{\frac{1}{3}}}$

Simplify.

$$\frac{a^2 b^{-1} c^{-3} d^5}{e^{-6} f^2 g^{-1} h^{-7}}$$

$$\frac{a^2\left(\frac{1}{b^1}\right)\left(\frac{1}{c^3}\right)d^5}{\frac{1}{e^6} f^2 \frac{1}{g^1} \frac{1}{h^7}}$$

$$= \frac{a^2 d^5 e^6 g^1 h^7}{b^1 c^3 f^2}$$

Ex.2 Simplify and evaluate for $x = -3$ and $n = -2$.

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

$= x^{3n+1+(5n-3)-(6n-3)}$

$= x^{3n+1+5n-3-6n+3}$

$= x^{2n+1}$

$= (-3)^{2(-2)+1}$

$= (-3)^{-4+1}$

$= (-3)^{-3}$

$= \frac{1}{(-3)^3}$

$= \frac{1}{-27}$

Extra, if time.

$$\left(\frac{\left(x^{18}\right)^{-\frac{1}{6}}}{\sqrt[5]{243x^{10}}} \right)^{0.5}$$

$$= \left(\frac{x^{-3}}{3x^{\frac{10}{5}}} \right)^{\frac{1}{2}}$$

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

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

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

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

$$= \frac{1}{\sqrt{3}} \frac{1}{x^{\frac{5}{2}}}$$

$$= \frac{1}{\sqrt{3}} \cdot \frac{1}{\sqrt{x^{5}}}$$

$$= \frac{1}{\sqrt{3x^{5}}}$$

Are there any Homework Questions you would like to see on the board?

Last day's work: **READ p.228**

pp. 229-230 #(1 – 6)ace, 8 – 11, 12ace, 14 [16]

The mid-chapter review is good practice for Tuesday's quiz!

SWYK Tuesday

Today's Homework Practice includes:

pp. 235-237 #(1 – 2)ace, 3, (4 – 9)ace [14]

Review p. 239