Notes 11/2

- Warm up with exponent rules & change of base

Radical exponents (square roots)

$\sqrt{x}$ (the basic) $= \sqrt[2]{x^1} = x^{1/2}$.

→ a regular square root always has a little 2.

Overall rule: $\sqrt[b]{x^a} = (\sqrt[b]{x})^a = x^{a/b}$

Examples - write in radical form

$x^{3/4} = \sqrt[4]{x^3}$ OR $(\sqrt[4]{x})^3$ * both ways are important because helpful for solving.

$2^{6/7} = \sqrt[7]{2^6}$ or $(\sqrt[7]{2})^6$

ex $8^{5/3} = \sqrt[3]{8^5}$ OR $(\sqrt[3]{8})^5$

not easy

$2^5 = 32$.

Examples - write in exponential form.

$\sqrt{x^4} = x^{4/2} = x^2$ $\qquad \sqrt[4]{x^2y^3} = x^{2/4}y^{3/4} = x^{1/2}y^{3/4}$

$\sqrt[3]{2^5} = 2^{5/3}$

Solving with exponents

- example question is $x^{4/3} = 100$, find x.

→ remember if you had $\sqrt{x} = 4$ how would you solve?

now rewrite $\sqrt{x} \rightarrow x^{1/2}$ so $x^{1/2} = 4$ now squaring both sides

$(x^{1/2})^2 = (4)^2$

$x^1 = 4^2$ make the exponent 1

$\boxed{x = 16}$

→ or if you have $x^2 = 64$ how would you solve?

now with the rules... $(x^2)^{1/2} = (64)^{1/2}$

$x^1 = 64^{1/2}$

$\boxed{x = 8}$

overall

make both sides to the exponent so x is to the 1.

examples

1. $x^{2/3} = 10$

$(x^{2/3})^{3/2} = 10^{3/2}$

$x^1 = 10^{3/2}$

$\boxed{x = 31.6}$

2. $\sqrt[4]{x^5} = 15$

$x^{5/4} = 15$

$(x^{5/4})^{4/5} = 15^{4/5}$

$x^1 = 15^{4/5}$

$\boxed{x = 8.7}$