Unit #2: Rational Exponents and Complex Numbers.

Rational Equation $\frac{2}{x} = 3$

Variable in Denominator.

Rational Exponent - Exponents that are fractions.

$\underline{16^{\frac{1}{4}}}$ 16^2

Complex numbers - Have a real and an imaginary part. $2 + 3i$

real imaginary

$i = \sqrt{-1}$

Propertirs of exponents

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

ex $x^4 \cdot x^5 = x^9$

$2^3 \cdot 2^3 = 2^6 \quad (2 \cdot 2 \cdot 2)(2 \cdot 2 \cdot 2) = 2^6$

$\frac{a^m}{a^n} = a^{m-n}$ ex: $\frac{a^3}{a^2} = a^{3-2} = a^1 = a$

$(a^m)^n = a^{m \cdot n}$ ex $(5^3)^4 = 5^{12}$

$(ab)^m = a^m b^m$ ex $(2xy)^4 = 2^4 x^4 y^4$

$= 16x^4y^4$

$a^{-n} = \frac{1}{a^n}$ ex $2^{-4} = \frac{1}{2^4}$

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

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

$$x^{\frac{1}{2}} = \sqrt{x}$$ ← Radical Form

↑ Exponent Form

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

$$4^{\frac{1}{2}} = 2$$

$$8^{\frac{1}{3}} = \sqrt[3]{8} = 2$$ ← cube root

$$27^{\frac{1}{3}} = \sqrt[3]{27} = 3$$

$$\sqrt[4]{15} = 15^{\frac{1}{4}}$$

$$7^{\frac{1}{2}} \cdot 7^{\frac{1}{2}} = \sqrt{7} \cdot \sqrt{7}$$

$$\downarrow \qquad = \sqrt{7 \cdot 7}$$

$$7^{\frac{1}{2}+\frac{1}{2}} \qquad = \sqrt{49}$$

$$\downarrow$$

$$7^{1} \qquad = 7$$

$$\underline{5^{\frac{1}{4}} \cdot 125^{\frac{1}{4}}} = \sqrt[4]{5} \cdot \sqrt[4]{125}$$
$$= \sqrt[4]{5 \cdot 125}$$
$$= \sqrt[4]{625}$$
$$= 5$$

$$6^{\frac{2}{3}} = \sqrt[3]{6^2}$$

write in Radical Form

$$x^{\frac{2}{7}} = \sqrt[7]{x^2}$$

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

write in exponential Form

Using a calculator to find

$\sqrt[4]{625}$

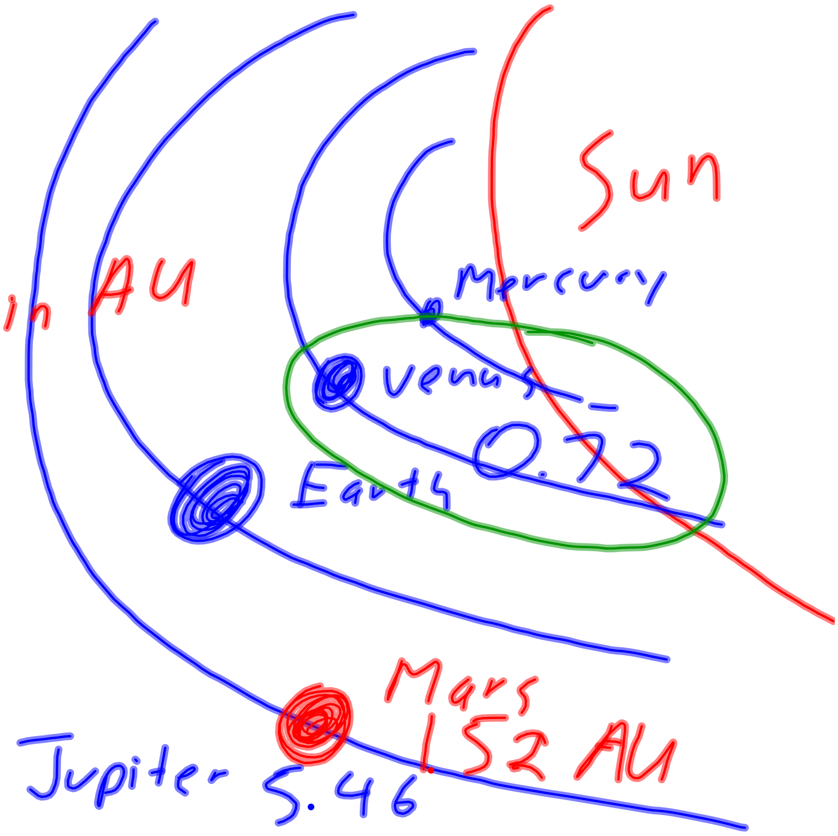
4 $\boxed{2^{nd}}$ $\boxed{\sqrt[x]{}}$ 625 $\boxed{=}$ 5

$\boxed{\wedge}$

$\sqrt{16} = 4$

$\sqrt{}$

$\boxed{x^2}$



$P = d^{\frac{3}{2}}$

↑ distante in AU

$= 1.52^{\frac{3}{2}}$

$= \sqrt[2]{1.52^3}$

$= \sqrt[2]{3.51}$

$= 1.87$

$1y = 365$

$(1.87)\,365\,day = 682.5$

$P = 0.72^{\frac{3}{2}}$

$= \sqrt{0.72^3} = 0.37$