Solving Equations with Rational Exponents

1. __Isolate__ the term raised to the exponent. base^{exp}
2. Raise both sides of equation to the
   __reciprocal exponent__ to cancel that exponent
3. Rewrite as a __radical__
4. __Simplify + Solve__

$$\left(x^{\frac{3}{4}}\right)^{4/3} = x$$

Ex. 1 Solve for x

$$\left(x^{\frac{3}{2}}\right)^{2/3} = 8^{2/3}$$

$x = 8^{2/3}$

$x = \sqrt[3]{8}^2$

$x = (2)^2$

$x = 4$

check

$(4)^{3/2} = 8$

$\sqrt{4}^3 =$

$(2)^3$

$8 = 8$ ✓

Ex. 2 Solve for b.

$$\left((8b)^{\frac{3}{4}}\right)^{4/3} = (64)^{4/3}$$

$8b = 64^{4/3}$

$8b = \sqrt[3]{64}^4$

$8b = (4)^4$

$\dfrac{8b}{8} = \dfrac{256}{8}$

$b = 32$

Ex. 3 Solve for b.

$\dfrac{8b^{\frac{3}{4}}}{8} = \dfrac{64}{8}$

Isolate $b^{3/4}$

$$\left(b^{3/4}\right)^{4/3} = (8)^{4/3}$$

$b = \sqrt[3]{8}^4$

$b = (2)^4$

$b = 16$

Ex. 4 Solve for x.

$(x - 24)^{\frac{3}{2}} - 5 = 211$

$\phantom{(x-24)^{3/2}} +5 \quad +5$

$$\left((x-24)^{3/2}\right)^{2/3} = (216)^{2/3}$$

$x - 24 = \sqrt[3]{216}^2$

$x - 24 = (6)^2$

$x - 24 = 36$

$ +24 \quad +24$

$x = 60$