Here are the key steps to solving equations w/rational (fraction) exponents:

Step 1- Be sure the base and fraction exponent are alone on one side

Step 2- Look at the fraction exponent on one side of the equation and determine its reciprocal

Step 3- Take both sides of the equation to that reciprocal power and solve

Example 1

$$m^{2/3} = 49$$

Step 1- Already done!

Step 2- Our exponent is $2/3$, so we will use the reciprocal, which is $3/2$.

Step 3-

$$m^{2/3} = 49$$
$$(m^{2/3})^{3/2} = (49)^{3/2}$$
$$m^1 = 7^3$$

$$\boxed{\boldsymbol{m = 343}}$$

Example 2

$$4m^{-1/3} = 20$$

Step 1- We need to divide both sides by 4

$$m^{-1/3} = 5$$

Step 2- Our exponent is $-1/3$, so we will use the reciprocal, which is -3 .

Step 3-

$$m^{-1/3} = 5$$
$$(m^{-1/3})^{-3} = (5)^{-3}$$
$$m^1 = \frac{1}{5^3}$$

$$\boxed{\boldsymbol{m = \frac{1}{125}}}$$

Example 3

$$(2w+5)^{1/4} = 3$$

Step 1- Already done!

Step 2- Our exponent is $1/4$, so we will use the reciprocal, which is 4 .

Step 3- $(2w+5)^{1/4} = 3$

$$((2w+5)^{1/4})^4 = (3)^4$$
$$2w+5 = 81$$
$$2w = 76$$

$$\boldsymbol{w = 38}$$

TIP: You can check your answers by substituting them into the original equations!