EQUALITY OF EXPONENTS

IF

$b^P = b^Q$

THEN

$P = Q$

POWER PRINCIPLE

IF

$P = Q$

THEN

$P^n = Q^n$

1. $2^X = 16$

$2^X = 2^4$

$X = 4$

2. $3^{X-5} = 27$

$3^{X-5} = 3^3$

$X - 5 = 3$

$X = 3 + 5$

$X = 8$

3. $\left(\frac{1}{4}\right)^{5X-1} = 8$

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

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

$2^{-10X+2} = 2^3$

$-10X + 2 = 3$

$-10X = 3 - 2$

$-10X = 1$

$\frac{-10X}{-10} = \frac{1}{-10}$

$X = -\frac{1}{10}$

IF FRACTIONAL EXPONENT

IF

$P^{\frac{a}{b}} = Q$

$P = Q^{\frac{b}{a}}$

IF a IS EVEN

PUT $\pm$ BEFORE Q

4. $X^{\frac{3}{4}} = 27$ ← ODD, SO NO $\pm$

$\left(X^{\frac{3}{4}}\right)^{\frac{4}{3}} = 27^{\frac{4}{3}}$

$X = \left(27^{\frac{1}{3}}\right)^4$

$X = \left(\sqrt[3]{27}\right)^4$

$X = \left(\sqrt[3]{3 \cdot 3 \cdot 3}\right)^4$

$X = 3^4$

$X = 81$

5. $X^{\frac{2}{3}} = 16$ ← EVEN, SO PUT $\pm$

$\left(X^{\frac{2}{3}}\right)^{\frac{3}{2}} = \pm 16^{\frac{3}{2}}$

$X = \pm\left(16^{\frac{1}{2}}\right)^3$

$X = \pm\left(\sqrt{16}\right)^3$

$X = \pm 4^3$

$X = \pm 64$