

4.2 Solving an Exponential Equation

Day 2 (1)

Ex 4 Solve $\left(\frac{1}{3}\right)^x = 81$

Make the bases the same if possible.

$$(3)^{-x} = 3^4$$

Set exponents equal

$$\frac{-x}{-1} = \frac{4}{-1}$$

$$\boxed{x = 4}$$

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check: $\left(\frac{1}{3}\right)^{-4} = 3^4 = 81 \checkmark$

Ex 5 Solve $2^{x+4} = 8^{x-6}$

$$2^{x+4} = (2^3)^{x-6}$$

$$2^{x+4} = 2^{3x-18}$$

$$\begin{array}{r} x+4 = 3x-18 \\ -x \quad \quad -x \end{array}$$

$$\begin{array}{r} 4 = 2x - 18 \\ +18 \quad \quad +18 \end{array}$$

$$\frac{22}{2} = \frac{2x}{2}$$

$$\boxed{11 = x}$$

Check:

$$2^{11+4} = 8^{11-6}$$

$$2^{15} = 8^5$$

$$32,768 = 32,768 \checkmark$$

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4.2 Solving Exp Eqn

Day 2 (2)

Ex 6 Solve $x^{\frac{4}{3}} = 81$

the base is the variable "x"

$$\left(x^{\frac{4}{3}}\right)^{\frac{3}{4}} = (81)^{\frac{3}{4}} = \left(81^{\frac{1}{4}}\right)^3$$

$$x^{\frac{12}{12}} = (\pm 3)^3$$

$$x = \pm 27$$

Check:

$$(+27)^{\frac{4}{3}} = \left(27^{\frac{1}{3}}\right)^4 = 3^4 = 81 \quad \checkmark$$

$$(-27)^{\frac{4}{3}} = \left((-27)^{\frac{1}{3}}\right)^4 = (-3)^4 = 81 \quad \checkmark$$