EXPONENTIAL EQUATIONS

Rewriting over a common base

The equation looks like it has different bases, but both are powers of 2.

BEFORE

Different bases

$$8^x = 4^{x+3}$$

The exponents cannot be compared yet

REWRITE THE BASES

$8 = 2^3$ and $4 = 2^2$, then the power of a power rule

▼ BASES TO SPOT

AFTER

Common base

$$2^{3x} = 2^{2(x+3)}$$

Ready for base matching

WHAT CHANGED	Only how the bases are written: $8^x = (2^3)^x = 2^{3x}$ and $4^{x+3} = (2^2)^{x+3} = 2^{2(x+3)}$.	WHAT STAYED	The value of each side, so the equation and its solutions are unchanged.