Exercise 279

For the following exercises, solve the exponential equation exactly.

$$4^{x+1} - 32 = 0$$

Solution

Isolate the term with the variable.

$$4^{x+1} = 32$$

Recognize that $4 = 2 \times 2$ and $32 = 2 \times 2 \times 2 \times 2 \times 2$.

$$(2^2)^{x+1} = 2^5$$

Write the exponents on the left as one.

$$2^{2(x+1)} = 2^5$$

Since the bases are equal, the exponents must be equal.

$$2(x+1) = 5$$

Solve for x.

$$x + 1 = \frac{5}{2}$$

$$x = \frac{3}{2}$$