How to Prove It: Exercises

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Introduction

Exercise 0.0.1

a. Factor $2^{15} - 1 = 32,767$ into a product of two smaller positive integers.

Answer. One such product is $7 * 4681$.

b. Find an integer x such that $1 < x < 2^{32767} - 1$ and $2^{32767} - 1$ is divisible by x.

Answer. We have $32767 = 7 * 4681$ from above. By Proof of Conjecture 2, let $x = 2^7 - 1$. Then $x = 127$, and x is a factor of 2^{32767}.