

Test the primality of 2887 and 481 using the Miller-Rabin test. Check with 3 bases if necessary.

For $n = 2887$.

We write $n - 1 = 2^s t$:

$$2886 = 2^1 \cdot 1443 \Rightarrow s = 1, t = 1443$$

We choose $b = 13$.

$$r = b^t \mod n = 13^{1443} = 13^{2^0+2^1+2^5+2^7+2^8+2^{10}} = 13 \cdot 13^{2^1+2^5+2^7+2^8+2^{10}} = 13 \cdot 13^2 \cdot 13^{2^5+2^7+2^8+2^{10}} = 2197 \cdot 13^3 \cdot 13^{2^7+2^8+2^{10}} = 1422 \cdot 1422^4 \cdot 1422^8 \cdot 13^{1023} = 1$$

Because $r = 1$, 2887 has passed the first iteration of the Miller-Rabin test

We choose $b = 7$

$$r = b^t \mod n = 7^{1443} = 7^{2^0+2^1+2^5+2^7+2^8+2^{10}} = 7 \cdot 7^{2^1+2^5+2^7+2^8+2^{10}} = 7 \cdot 7^2 \cdot 7^{2^5+2^7+2^8+2^{10}} = 343 \cdot 13^3 \cdot 7^{2^7+2^8+2^{10}} = \dots = 1 \mod 2887$$

Because $r = 1$, 2887 has passed the second iteration of the Miller-Rabin test

We choose $b = 69$

$$r = b^t \mod n = 69^{1443} \mod 2887 = 1 \mod 2887$$

Because $r = 1$, 2887 has passed the third iteration of the Miller-Rabin test, and we can say that it is prime with probability $1 - 1/4^3 = 98.43\%$.

For $n = 481$.

$$480 = 2^5 \cdot 15 \Rightarrow s = 5, t = 15.$$

We choose $b = 432$.

$$r = b^t \mod n = 432^{15} \mod 481 = 432^{2^0+2^1+2^2+2^3} \mod 481 = 27 \mod 481.$$

Because $27 \neq 1$ and $27 \neq 480$ we repeatedly square r , $s - 1$ times, and we get: 248, 417, 248, 417.

Because the last one is not $n - 1 = 480$, we can say that 481 is composite.