On The Prime theorem:

x^6+1091 has no prime solutions

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Abstract: Using Jiang function we prove that x^6+1091 has no prime solutions.

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Shanks conjectured[1,2]:

Table 52.

$f(x)$	$f(m)$ is composite for all m up to
x^6+1091	3905
$x^6+82991$	7979
$x^{12}+4094$	170624
$x^{12}+488669$	616979

The smallest prime value of the last polynomial has no less than 70 digits.

Theorem 1.

$$(P+1)^6+1091 \tag{1}$$

has no prime solutions

Proof. We have Jiang function[3]

$$J_2(\omega)=\prod_P[P-1-\chi(P)], \tag{2}$$

where $\omega=\prod_P P$,

$\chi(P)$ is the number of solutions of congruence

$$(q+1)^6+1091\equiv 0 \pmod P \tag{3}$$

$q=1,\cdots,P-1$.

From (3) we have $\chi(2)=0$, $\chi(3)=2$, $\chi(5)=2$, $\chi(7)=6$.
Substituting it into (2) we have

$J_2(3)=0$, $J_2(7)=0$.

We have prove that (1) has no prime solutions.

In the same way we prove that $x^6+82991$ has no prime solutions.

Theorem 2.

$$P^{12}+4094 \tag{4}$$

has no prime solutions

Proof. We have Jiang function [3]

$$J_2(\omega)=\prod_P[P-1-\chi(P)], \tag{5}$$

$\chi(P)$ is the number of solutions of congruence

$$q^{12}+4094 \equiv 0 \pmod P, \quad q=1,\cdots,P-1. \qquad (6)$$

From (6) we have

$$\chi(5)=4, \quad \chi(13)=12 \qquad (7)$$

Substituting it into (5) we have $J_2(5)=0, J_2(13)=0$. We prove (4) has no prime solutions.

In the same way we are able to prove $x^{12}+488669$ has no prime solutions

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