> $\# \, sum \, x^x = Prime$ **by** $H \cdot E \; 2019-11-9:$

> $c := 0 : s := 0$ **:for** h **from** 1 **to** 10000 **do** $s := s + h^h$ **:if** $isprime(s)$ **then if** $h \le 5$ **then** $c := c + 1 : print\left(\sum_{j=1}^{h} [j]^j = Prime \; (H \cdot E[No = c])\right)$ **else** $print([1]^1 + [2]^2 + [3]^3 + xxx + [h-1]^{h-1} + [h]^h = Prime(s)[H \cdot E[No = c]])$ **end if fi :od:**

$$[1] + [2]^2 = Prime \; (H \cdot E_{No=1})$$

$$[1] + [2]^2 + [3]^3 + [4]^4 + [5]^5 = Prime \; (H \cdot E_{No=2})$$

$$[1] + [2]^2 + [3]^3 + xxx + [5]^5 + [6]^6 = Prime(50069)_{H \cdot E_{No=2}}$$

$$[1] + [2]^2 + [3]^3 + xxx + [9]^9 + [10]^{10} = Prime(10405071317)_{H \cdot E_{No=2}}$$

$$[1] + [2]^2 + [3]^3 + xxx + [29]^{29} + [30]^{30} = Prime(208492413443704093346554910065262730566475781)_{H \cdot E_{No=2}} \quad (1)$$

> **for** e **from** 2 **to** 6 **do** $print(\,) : c := 0 : s := 1$ **:for** h **from** 1 **to** 200 **do** $s := s + ithprime(h)^e:$ **if** $isprime(s)$ **then** $c := c + 1$ **:if** $h \le 5$ **then** $print\left([1] + \sum_{j=1}^{h} ithprime(j) \; [\{j\} \; th \, p]^e = Prime \; (s)[H \cdot E[No = c]]\right)$ **else** $print(1^e + [[2][\{1\} \; th \, p]]^e + [[3][2 \; th \, p]]^e + xxx + [ithprime(h-1)[(h-1) \; th \, p]]^e + [ithprime(\; h)[h \; th \, p]]^e = Prime(s)[H \cdot E[No = c]])$ **end if fi :od:od:**

$$[1] + 2^2_{\{1\} \; th \, p} = Prime \; 5_{H \cdot E_{No=1}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [29_{10 \; th \, p}]^2 + [31_{11 \; th \, p}]^2 = Prime(3359)_{H \cdot E_{No=2}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [61_{18 \; th \, p}]^2 + [67_{19 \; th \, p}]^2 = Prime(24967)_{H \cdot E_{No=3}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [107_{28 \; th \, p}]^2 + [109_{29 \; th \, p}]^2 = Prime(109937)_{H \cdot E_{No=4}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [151_{36 \; th \, p}]^2 + [157_{37 \; th \, p}]^2 = Prime(263737)_{H \cdot E_{No=5}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [359_{72 \; th \, p}]^2 + [367_{73 \; th \, p}]^2 = Prime(2841373)_{H \cdot E_{No=6}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [503_{96 \; th \, p}]^2 + [509_{97 \; th \, p}]^2 = Prime(7547077)_{H \cdot E_{No=7}}$$

$$1 + [[2]_{\{1\} \; th \, p}]^2 + [[3]_{2 \; th \, p}]^2 + xxx + [887_{154 \; th \, p}]^2 + [907_{155 \; th \, p}]^2 = Prime(37464551)_{H \cdot E_{No=8}}$$

$$1+[[2]_{\{1\}\ th\,p}]^2+[[3]_{2\,th\,p}]^2+xxx+[953_{162\,th\,p}]^2+[967_{163\,th\,p}]^2 = Prime(44505631)_{H\bullet E_{No=9}}$$

$$1+[[2]_{\{1\}\ th\,p}]^2+[[3]_{2\,th\,p}]^2+xxx+[1033_{174\,th\,p}]^2+[1039_{175\,th\,p}]^2 = Prime(56680003)_{H\bullet E_{No=10}}$$

$$1+[[2]_{\{1\}\ th\,p}]^2+[[3]_{2\,th\,p}]^2+xxx+[1151_{190\,th\,p}]^2+[1153_{191\,th\,p}]^2 = Prime(75937523)_{H\bullet E_{No=11}}$$

$$1+[[2]_{\{1\}\ th\,p}]^3+[[3]_{2\,th\,p}]^3+xxx+[71_{20\,th\,p}]^3+[73_{21\,th\,p}]^3 = Prime(2013983)_{H\bullet E_{No=1}}$$

$$1+[[2]_{\{1\}\ th\,p}]^3+[[3]_{2\,th\,p}]^3+xxx+[997_{168\,th\,p}]^3+[1009_{169\,th\,p}]^3 = Prime(37528375567)_{H\bullet E_{No=2}}$$

$$1+[[2]_{\{1\}\ th\,p}]^3+[[3]_{2\,th\,p}]^3+xxx+[1061_{178\,th\,p}]^3+[1063_{179\,th\,p}]^3 = Prime(48720948259)_{H\bullet E_{No=3}}$$

$$[1]+2^4_{\{1\}\ th\,p} = Prime\ 17_{H\bullet E_{No=1}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[37_{12\,th\,p}]^4+[41_{13\,th\,p}]^4 = Prime(6870733)_{H\bullet E_{No=2}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[181_{42\,th\,p}]^4+[191_{43\,th\,p}]^4 = Prime(9723349723)_{H\bullet E_{No=3}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[349_{70\,th\,p}]^4+[353_{71\,th\,p}]^4 = Prime(190977764951)_{H\bullet E_{No=4}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[541_{100\,th\,p}]^4+[547_{101\,th\,p}]^4 = Prime(1503145202981)_{H\bullet E_{No=5}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[857_{148\,th\,p}]^4+[859_{149\,th\,p}]^4 = Prime(14418852565829)_{H\bullet E_{No=6}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[953_{162\,th\,p}]^4+[967_{163\,th\,p}]^4 = Prime(24276490010083)_{H\bullet E_{No=7}}$$

$$1+[[2]_{\{1\}\ th\,p}]^4+[[3]_{2\,th\,p}]^4+xxx+[1151_{190\,th\,p}]^4+[1153_{191\,th\,p}]^4 = Prime(59907449687471)_{H\bullet E_{No=8}}$$

$$1+[[2]_{\{1\}\ th\,p}]^5+[[3]_{2\,th\,p}]^5+xxx+[29_{10\,th\,p}]^5+[31_{11\,th\,p}]^5$$

$$= Prime(60025151)_{H \cdot E_{No=1}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [71_{20\ th\ p}]^5 + [73_{21\ th\ p}]^5 = Prime(7826720903)_{H \cdot E_{No=2}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [229_{50\ th\ p}]^5 + [233_{51\ th\ p}]^5 = Prime(5315694312101)_{H \cdot E_{No=3}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [503_{96\ th\ p}]^5 + [509_{97\ th\ p}]^5 = Prime(503388827998099)_{H \cdot E_{No=4}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [953_{162\ th\ p}]^5 + [967_{163\ th\ p}]^5 = Prime(19398671440091479)_{H \cdot E_{No=5}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [997_{168\ th\ p}]^5 + [1009_{169\ th\ p}]^5 = Prime(25056561870953887)_{H \cdot E_{No=6}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [1061_{178\ th\ p}]^5 + [1063_{179\ th\ p}]^5 = Prime(37137845945657467)_{H \cdot E_{No=7}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^5 + [[3]_{2\ th\ p}]^5 + xxx + [1109_{186\ th\ p}]^5 + [1117_{187\ th\ p}]^5 = Prime(49794637822344073)_{H \cdot E_{No=8}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^6 + [[3]_{2\ th\ p}]^6 + xxx + [181_{42\ th\ p}]^6 + [191_{43\ th\ p}]^6 = Prime(254637172916827)_{H \cdot E_{No=1}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^6 + [[3]_{2\ th\ p}]^6 + xxx + [199_{46\ th\ p}]^6 + [211_{47\ th\ p}]^6 = Prime(515121222006767)_{H \cdot E_{No=2}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^6 + [[3]_{2\ th\ p}]^6 + xxx + [421_{82\ th\ p}]^6 + [431_{83\ th\ p}]^6 = Prime(64165941996249827)_{H \cdot E_{No=3}}$$

$$1 + [[2]_{\{1\}\ th\ p}]^6 + [[3]_{2\ th\ p}]^6 + xxx + [1021_{172\ th\ p}]^6 + [1031_{173\ th\ p}]^6 = Prime(2610152151085169729З)_{H \cdot E_{No=4}} \quad \textbf{(2)}$$

> *lhs*(**(2)**)

$$1 + [[2]_{\{1\}\ th\ p}]^6 + [[3]_{2\ th\ p}]^6 + xxx + [1021_{172\ th\ p}]^6 + [1031_{173\ th\ p}]^6 \quad \textbf{(3)}$$

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