

$$\left[\begin{array}{l} > \# \frac{3^n - 1}{3 - 1} = \text{prime by } H \cdot E : \\ > \end{array} \right.$$

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> with(StringTools) : print(蛭子井博孝, FormatTime("%Y-%m-%d-(%or)") ) :for e from 2
to 10 do c := 0 : for h from 1 to 50 do if isprime( (e^h - 1) / (e - 1) ) then c := c + 1 : HEP :=
( (e^h - 1) / (e - 1) ) : print( HEA[ ( [e]^{h-1} ) . ( ( [e]^h - 1 ) / ( [e] - 1 ) ) ] = e^{h-1} . HEP ) : sy := ( sum_{n=0}^{h-1} e^n )
+ ( sum_{n=0}^{h-2} e^n ) . HEP : print( (e - 1) . sy - (e - 2) . HEP = e^{h-1} HEP ) fi:od:od:
print(蛭子井博孝, FormatTime("%Y-%m-%d-(%or)") ) :
蛭子井博孝, "2020-02-17-(06:03:51 PM)"
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$$\begin{aligned} \text{HEA} \frac{[2] ([2]^2 - 1)}{[2] - 1} &= 6 \\ 6 &= 6 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^2 ([2]^3 - 1)}{[2] - 1} &= 28 \\ 28 &= 28 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^4 ([2]^5 - 1)}{[2] - 1} &= 496 \\ 496 &= 496 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^6 ([2]^7 - 1)}{[2] - 1} &= 8128 \\ 8128 &= 8128 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^{12} ([2]^{13} - 1)}{[2] - 1} &= 33550336 \\ 33550336 &= 33550336 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^{16} ([2]^{17} - 1)}{[2] - 1} &= 8589869056 \\ 8589869056 &= 8589869056 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^{18} ([2]^{19} - 1)}{[2] - 1} &= 137438691328 \\ 137438691328 &= 137438691328 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[2]^{30} ([2]^{31} - 1)}{[2] - 1} &= 2305843008139952128 \\ 2305843008139952128 &= 2305843008139952128 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[3]^2 ([3]^3 - 1)}{[3] - 1} &= 117 \\ 117 &= 117 \end{aligned}$$

$$\begin{aligned} \text{HEA} \frac{[3]^6 ([3]^7 - 1)}{[3] - 1} &= 796797 \\ 796797 &= 796797 \end{aligned}$$

$$HEA \frac{[3]^{12} ([3]^{13} - 1)}{[3] - 1} = 423644039001$$

$$423644039001 = 423644039001$$

$$HEA \frac{[4] ([4]^2 - 1)}{[4] - 1} = 20$$

$$20 = 20$$

$$HEA \frac{[5]^2 ([5]^3 - 1)}{[5] - 1} = 775$$

$$775 = 775$$

$$HEA \frac{[5]^6 ([5]^7 - 1)}{[5] - 1} = 305171875$$

$$305171875 = 305171875$$

$$HEA \frac{[5]^{10} ([5]^{11} - 1)}{[5] - 1} = 119209287109375$$

$$119209287109375 = 119209287109375$$

$$HEA \frac{[5]^{12} ([5]^{13} - 1)}{[5] - 1} = 74505805908203125$$

$$74505805908203125 = 74505805908203125$$

$$HEA \frac{[5]^{46} ([5]^{47} - 1)}{[5] - 1}$$

$$= 25243548967072377773175314089049123822405817918479442596435546875$$

$$25243548967072377773175314089049123822405817918479442596435546875$$

$$= 25243548967072377773175314089049123822405817918479442596435546875$$

$$HEA \frac{[6] ([6]^2 - 1)}{[6] - 1} = 42$$

$$42 = 42$$

$$HEA \frac{[6]^2 ([6]^3 - 1)}{[6] - 1} = 1548$$

$$1548 = 1548$$

$$HEA \frac{[6]^6 ([6]^7 - 1)}{[6] - 1} = 2612129472$$

$$2612129472 = 2612129472$$

$$HEA \frac{[6]^{28} ([6]^{29} - 1)}{[6] - 1} = 45253405537675238416038357250237295801401344$$

$$45253405537675238416038357250237295801401344$$

$$= 45253405537675238416038357250237295801401344$$

$$HEA \frac{[7]^4 ([7]^5 - 1)}{[7] - 1} = 6725201$$

$$6725201 = 6725201$$

$$HEA \frac{[7]^{12} ([7]^{13} - 1)}{[7] - 1} = 223511436608353935601$$

$$223511436608353935601 = 223511436608353935601$$

$$HEA_{[8]^2([8]^3-1)} = 4672$$

$$4672 = 4672$$

$$HEA_{[10]([10]^2-1)} = 110$$

$$110 = 110$$

$$HEA_{[10]^{18}([10]^{19}-1)} = 11111111111111111111000000000000000000$$

$$11111111111111111111000000000000000000$$

$$= 11111111111111111111000000000000000000$$

$$HEA_{[10]^{22}([10]^{23}-1)} = 11111111111111111111100000000000000000000$$

$$1111111111111111111110000000000000000000000$$

$$= 1111111111111111111110000000000000000000000$$

蛭子井博孝, "2020-02-17-(06:03:52 PM)"

(1)

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> with(StringTools) : print( ) : print( ) : print(蛭子井博孝, "完全数の一般化",
  FormatTime("%Y-%m-%d-%r")) : for e from 2 to 10 do c := 0 : for h from 1 to 100
  do if isprime( (e^h - 1) / (e - 1) ) then c := c + 1 : HEP := ( (e^h - 1) / (e - 1) ) : HEA := e^{h-1} · HEP :
  print( G[ene]P[erf]N[umb] [ ( [e]^h - 1 ) / ( [e] - 1 ) ] = HEA[ { e^{h-1} } · [HEP] ] ) :
  print( ) : sy := ( sum_{n=0}^{h-1} e^n ) + ( sum_{n=0}^{h-2} e^n ) · HEP : print( ( (e - 1) · sy - (e - 2) · HEP ) [ [ [e]
  - 1 ] · { sy[GPNの自身以外の約数の和] } - [ [e] - 2 ] · { HEP[ gene - meru - prim ] } ]
  = HEA[ 完全数 ] ) : print( ) : print( ) fi od od : print(蛭子井博孝,
  FormatTime("%Y-%m-%d-%r")) :
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蛭子井博孝, "完全数の一般化", "2020-02-17-(10:56:45 PM)"

$$G_{ene} P_{erf} (N_{umb})_{[2]([2]^2-1)} = 6_{\{2\} [3]}$$

$$6_{[[2]-1]} \{ 6_{GPNの自身以外の約数の和} - [[2]-2] \{ 3_{gene-meru-prim} \} \} = 6_{完全数}$$

$$G_{ene} P_{erf} (N_{umb})_{[2]^2([2]^3-1)} = 28_{\{4\} [7]}$$

$$28_{[[2]-1]} \{ 28_{GPNの自身以外の約数の和} - [[2]-2] \{ 7_{gene-meru-prim} \} \} = 28_{完全数}$$

$$G_{ene} P_{erf} (N_{umb}) \frac{[2]^4 ([2]^5 - 1)}{[2] - 1} = 496_{\{16\} [31]}$$

$$496_{[[2] - 1] \{496_{GPNの自身以外の約数の和}\} - [[2] - 2] \{31_{gene - meru - prim}\}} = 496_{完全数}$$

$$G_{ene} P_{erf} (N_{umb}) \frac{[2]^6 ([2]^7 - 1)}{[2] - 1} = 8128_{\{64\} [127]}$$

$$8128_{[[2] - 1] \{8128_{GPNの自身以外の約数の和}\} - [[2] - 2] \{127_{gene - meru - prim}\}} = 8128_{完全数}$$

$$G_{ene} P_{erf} (N_{umb}) \frac{[2]^{12} ([2]^{13} - 1)}{[2] - 1} = 33550336_{\{4096\} [8191]}$$

$$33550336_{[[2] - 1] \{33550336_{GPNの自身以外の約数の和}\} - [[2] - 2] \{8191_{gene - meru - prim}\}} = 33550336_{完全数}$$

$$G_{ene} P_{erf} (N_{umb}) \frac{[2]^{16} ([2]^{17} - 1)}{[2] - 1} = 8589869056_{\{65536\} [131071]}$$

$$8589869056_{[[2] - 1] \{8589869056_{GPNの自身以外の約数の和}\} - [[2] - 2] \{131071_{gene - meru - prim}\}} = 8589869056_{完全数}$$

$$G_{ene} P_{erf} (N_{umb}) \frac{[2]^{18} ([2]^{19} - 1)}{[2] - 1} = 137438691328_{\{262144\} [524287]}$$

$$137438691328_{[[2] - 1] \{137438691328_{GPNの自身以外の約数の和}\} - [[2] - 2] \{524287_{gene - meru - prim}\}} = 137438691328_{完全数}$$

$$G_{ene} P_{erf} (N_{umb}) \frac{[2]^{30} ([2]^{31} - 1)}{[2] - 1} = 2305843008139952128_{\{1073741824\} [2147483647]}$$

$$2305843008139952128_{[[2] - 1] \{2305843008139952128_{GPNの自身以外の約数の和}\} - [[2] - 2] \{2147483647_{gene - meru - prim}\}} = 2305843008139952128_{完全数}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[2]^{60} ([2]^{61} - 1)}{[2] - 1} = 2658455991569831744654692615953842176_{\{1152921504606846976\} [2305843009213693951]}$$

$$2658455991569831744654692615953842176_{[[2] - 1] \{2658455991569831744654692615953842176_{\text{GPNの自身以外の約数の和}}\} - [[2] - 2] \{2305843009213693951_{\text{gene - meru - prim}}\}} = 2658455991569831744654692615953842176_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[2]^{88} ([2]^{89} - 1)}{[2] - 1} = 191561942608236107294793378084303638130997321548169216_{\{309485009821345068724781056\} [618970019642690137449562111]}$$

$$191561942608236107294793378084303638130997321548169216_{[[2] - 1] \{191561942608236107294793378084303638130997321548169216_{\text{GPNの自身以外の約数の和}}\} - [[2] - 2] \{618970019642690137449562111_{\text{gene - meru - prim}}\}} = 191561942608236107294793378084303638130997321548169216_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[3]^2 ([3]^3 - 1)}{[3] - 1} = 117_{\{9\} [13]}$$

$$117_{[[3] - 1] \{65_{\text{GPNの自身以外の約数の和}}\} - [[3] - 2] \{13_{\text{gene - meru - prim}}\}} = 117_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[3]^6 ([3]^7 - 1)}{[3] - 1} = 796797_{\{729\} [1093]}$$

$$796797_{[[3] - 1] \{398945_{\text{GPNの自身以外の約数の和}}\} - [[3] - 2] \{1093_{\text{gene - meru - prim}}\}} = 796797_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[3]^{12} ([3]^{13} - 1)}{[3] - 1} = 423644039001_{\{531441\} [797161]}$$

$$423644039001_{[[3] - 1] \{211822418081_{\text{GPNの自身以外の約数の和}}\} - [[3] - 2] \{797161_{\text{gene - meru - prim}}\}} = 423644039001_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[3]^{70} ([3]^{71} - 1)}{[3] - 1}$$

$$= 93986812232669555688843362915128942467322891735951972545034040332 \setminus$$

$$77 \{2503155504993241601315571986085849\} [3754733257489862401973357979128773]$$

$$9398681223266955568884336291512894246732289173595197254503404033277 \text{ } [[3]$$

$$- 1]$$

$$\{4699340611633477784442168145756449000732773331728799613930691581025 \text{ } \text{GPNの自身以外の約数の和}\}$$

$$- [[3] - 2] \{3754733257489862401973357979128773 \text{ } \text{gene - meru - prim}\}$$

$$= 93986812232669555688843362915128942467322891735951972545034040332 \setminus$$

$$77 \text{ 完全数}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[4] ([4]^2 - 1)}{[4] - 1} = 20_{\{4\} [5]}$$

$$20_{[[4] - 1]} \{10 \text{ } \text{GPNの自身以外の約数の和}\} - [[4] - 2] \{5 \text{ } \text{gene - meru - prim}\} = 20 \text{ 完全数}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[5]^2 ([5]^3 - 1)}{[5] - 1} = 775_{\{25\} [31]}$$

$$775_{[[5] - 1]} \{217 \text{ } \text{GPNの自身以外の約数の和}\} - [[5] - 2] \{31 \text{ } \text{gene - meru - prim}\} = 775 \text{ 完全数}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[5]^6 ([5]^7 - 1)}{[5] - 1} = 305171875_{\{15625\} [19531]}$$

$$305171875_{[[5] - 1]} \{76307617 \text{ } \text{GPNの自身以外の約数の和}\} - [[5] - 2] \{19531 \text{ } \text{gene - meru - prim}\}$$

$$= 305171875 \text{ 完全数}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[5]^{10} ([5]^{11} - 1)}{[5] - 1} = 119209287109375_{\{9765625\} [12207031]}$$

$$119209287109375_{[[5] - 1]} \{29802330932617 \text{ } \text{GPNの自身以外の約数の和}\} - [[5]$$

$$- 2] \{12207031 \text{ } \text{gene - meru - prim}\} = 119209287109375 \text{ 完全数}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[5]^{12} ([5]^{13} - 1)}{[5] - 1} = 74505805908203125_{\{244140625\} [305175781]}$$

$$74505805908203125_{[[5] - 1] \{18626451705932617 \text{ GPNの自身以外の約数の和}\}} - [[5] - 2]_{\{305175781 \text{ gene - meru - prim}\}} = 74505805908203125_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[5]^{46} ([5]^{47} - 1)}{[5] - 1} = 25243548967072377773175314089049123822405817918479442596435546875_{\{142108547152020037174224853515625\} [177635683940025046467781066894531]}$$

$$25243548967072377773175314089049123822405817918479442596435546875_{[[5] - 1] \{6310887241768094443293828522262414182364409498404711484909057617 \text{ GPNの自身以外の約数の和}\}} - [[5] - 2]_{\{177635683940025046467781066894531 \text{ gene - meru - prim}\}} = 25243548967072377773175314089049123822405817918479442596435546875_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[6] ([6]^2 - 1)}{[6] - 1} = 42_{\{6\} [7]}$$

$$42_{[[6] - 1] \{14 \text{ GPNの自身以外の約数の和}\}} - [[6] - 2]_{\{7 \text{ gene - meru - prim}\}} = 42_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[6]^2 ([6]^3 - 1)}{[6] - 1} = 1548_{\{36\} [43]}$$

$$1548_{[[6] - 1] \{344 \text{ GPNの自身以外の約数の和}\}} - [[6] - 2]_{\{43 \text{ gene - meru - prim}\}} = 1548_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[6]^6 ([6]^7 - 1)}{[6] - 1} = 2612129472_{\{46656\} [55987]}$$

$$2612129472_{[[6] - 1] \{522470684 \text{ GPNの自身以外の約数の和}\}} - [[6] - 2]_{\{55987 \text{ gene - meru - prim}\}} = 2612129472_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[6]^{28} ([6]^{29} - 1)}{[6] - 1} = 45253405537675238416038357250237295801401344_{\{6140942214464815497216\} [736913065735778596659]}$$

$$\begin{aligned}
& 45253405537675238416038357250237295801401344_{[[6]} \\
& - 1] \left\{ 9050681107535047683213566754573345383157596 \right. \\
& \quad \left. - 2] \left\{ 7369130657357778596659 \right. \right. \\
& \quad \quad \left. \left. \begin{array}{l} \text{GPNの自身以外の約数の和} \\ \text{gene - meru - prim} \end{array} \right\} - [[6] \right\} \\
& = 45253405537675238416038357250237295801401344_{\text{完全数}}
\end{aligned}$$

$$\begin{aligned}
& G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \\
& \quad \frac{_{[[6]}70 (_{[[6]}71 - 1)}{_{[[6]} - 1}} \\
& = 10479879758114524151592970014297167178596352926456200057916091894 \setminus \\
& 074079869972240245048474883508320422745604096 \{ \\
& 2955204414547681244658707659790455381671329323051646976 \} \\
& [3546245297457217493590449191748546458005595187661976371]
\end{aligned}$$

$$\begin{aligned}
& 10479879758114524151592970014297167178596352926456200057916091894074079869 \setminus \\
& 972240245048474883508320422745604096_{[[6]} \\
& - 1] \\
& \{ \\
& 2095975951622904830318594002859433435719270585291240014420214616780589968866807402408532143106 \setminus \\
& 140234678701916 \} - [[6] \\
& - 2] \left\{ 3546245297457217493590449191748546458005595187661976371 \right. \\
& \quad \left. \begin{array}{l} \text{GPNの自身以外の約数の和} \\ \text{gene - meru - prim} \end{array} \right\} \\
& = 10479879758114524151592970014297167178596352926456200057916091894 \setminus \\
& 074079869972240245048474883508320422745604096_{\text{完全数}}
\end{aligned}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{_{[[7]}4 (_{[[7]}5 - 1)}{_{[[7]} - 1}} = 6725201_{\{2401\} [2801]}$$

$$\begin{aligned}
& 6725201_{[[7] - 1] \{1123201 \text{ GPNの自身以外の約数の和} \} - [[7] - 2] \{2801 \text{ gene - meru - prim} \}} \\
& = 6725201_{\text{完全数}}
\end{aligned}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{_{[[7]}12 (_{[[7]}13 - 1)}{_{[[7]} - 1}} = 223511436608353935601_{\{13841287201\} [16148168401]}$$

$$\begin{aligned}
& 223511436608353935601_{[[7] - 1] \{37251906114849129601 \text{ GPNの自身以外の約数の和} \} - [[7]} \\
& - 2] \{16148168401 \text{ gene - meru - prim} \}} = 223511436608353935601_{\text{完全数}}
\end{aligned}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{_{[[8]}2 (_{[[8]}3 - 1)}{_{[[8]} - 1}} = 4672_{\{64\} [73]}$$

$$4672_{[[8] - 1] \{730 \text{ GPNの自身以外の約数の和} \} - [[8] - 2] \{73 \text{ gene - meru - prim} \}} = 4672_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[10]([10]^2 - 1)}{[10] - 1} = 110_{\{10\} [11]}$$

$$110_{[[10] - 1] \{^{22} \text{GPNの自身以外の約数の和}\} - [[10] - 2] \{^{11} \text{gene - meru - prim}\}} = 110_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[10]^{18} ([10]^{19} - 1)}{[10] - 1} = 111111111111111111110000000000000000000_{\{10000000000000000000\} [1111111111111111111]}$$

$$111111111111111111110000000000000000000_{[[10] - 1] \{^{123456790123456791098765432098765432} \text{GPNの自身以外の約数の和}\} - [[10] - 2] \{^{11111111111111111111} \text{gene - meru - prim}\}} = 111111111111111111110000000000000000000_{\text{完全数}}$$

$$G_{\text{ene}} P_{\text{erf}}(N_{\text{umb}}) \frac{[10]^{22} ([10]^{23} - 1)}{[10] - 1} = 111111111111111111111111110000000000000000000000000_{\{100000000000000000000000000000000\} [1111111111111111111]}$$

$$111111111111111111111111110000000000000000000000000_{[[10] - 1] \{^{12345679012345679012355432098765432098765432} \text{GPNの自身以外の約数の和}\} - [[10] - 2] \{^{11111111111111111111111111} \text{gene - meru - prim}\}} = 111111111111111111111111110000000000000000000000000_{\text{完全数}}$$

蛭子井博孝, "2020-02-17-(10:56:46 PM)"