An interesting pattern of primes

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If you observe below there is a a correlation between x and y . X will Always be a positive even number and y will always be a positive odd number and its subtraction will give 7 until a certain prime number and there after it will be a different correlation where the result is 8 and after a while it will be 9 and so on. Later i will repost its new correlation, for now it is enough to see that this pattern holds until the 1062 nd prime.

mathematica
```
( Defining the ordered pairs )
pairs = {{8, 1}, {10, 3}, {12, 5}, {14, 7}, {16, 9}, {18, 11}, {20, 13}, {22, 15}, {24,
17}, {26, 19}, {28, 21}, {30, 23}};

( Function to verify if a is prime )
isPrimeZ[x_, y_] := Module[{z},
    z = 7000 + 914 + y;
    z == 7907 + x && PrimeQ[z]
  ];

( Filttering the pairs that satisfy the conditiom)
results = Select[pairs, isPrimeZ[#[[1]], #[[2]]] &];

( Exihibiting the results)
results
```

$$\{\{12,5\},\{20,13\},\{26,19\},\{30,23\}\}$$

mathematica
```
( Defining the ordered pairs )
pairs =
{{10,2},{12,4},{14,6},{16,8},{18,10},{20,12},{22,14},{24,16},{26,18},{28,20},{30,22
},{32,24},{34,26},{36,28},{38,30},{40,32},{42,34},{44,36},{46,38},{48,40},{50,42},{
52,44},{54,46},{56,48},{58,50},{60,52},{62,54},{64,56},{66,58},{68,60},{70,62},{7
2,64},{74,66},{76,68},{78,70},{80,72},{82,74},{84,76},{86,78},{88,80},{90,82}};

( Function to verify if a is prime )
isPrimeZ[x_, y_] := Module[{z},
  z = 16000 + 1395 + y;
  z == 17387 + x && PrimeQ[z]
];

( Filttering the pairs that satisfy the conditiom)
results = Select[pairs, isPrimeZ[#[[1]], #[[2]]] &];
```

(Exihibiting the results)
Results

RULE 1

{{14,6},{30,22},{32,24},{44,36},{56,48},{62,54},{80,72},{84,76},{90,82}}

mathematica
AS=Cases[Tuples[Range[190],2],{p_,i_}/;EvenQ@p && OddQ@i && p-i==7]
(Defining the ordered pairs)
pairs = AS;

(Function to verify if a is prime)
isPrimeZ[x_, y_] := Module[{z},
  z = 7000 + 914 + y;
  z == 7907 + x && PrimeQ[z]
];

(Filttering the pairs that satisfy the conditiom)
results = Select[pairs, isPrimeZ[#[[1]], #[[2]]] &];

(Exihibiting the results)
results
po = results[[All, 1]]
Differences[%]
pp=results[[All, 2]]
pc=pairs[[All,1]]
ListLinePlot[results]
a=ListLinePlot[po,PlotStyle->Red]
b=ListLinePlot[pp,PlotStyle->Green]
d=ListLinePlot[pc,PlotStyle->Blue]
c=Show[a,b,d]

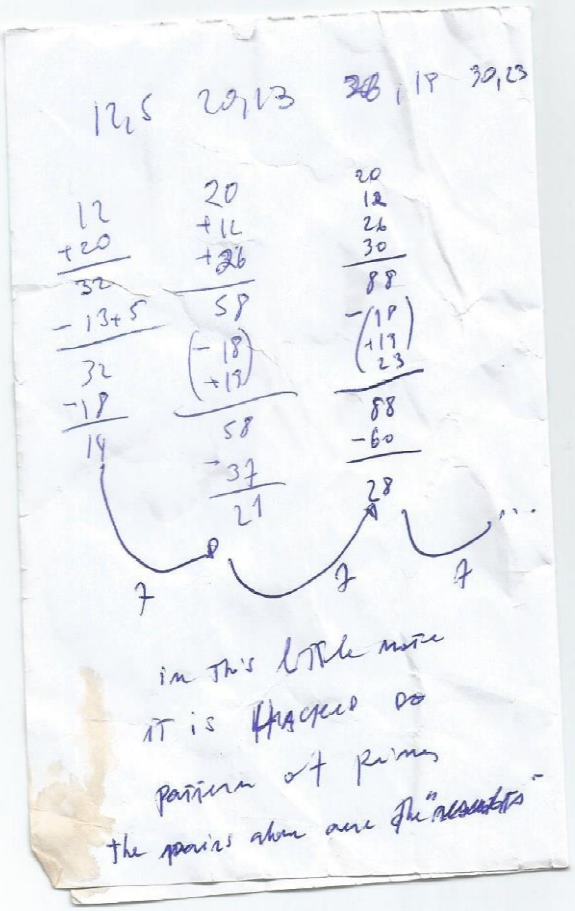
{{12,5},{20,13},{26,19},{30,23},{42,35},{44,37},{56,49},{86,79},{102,95},{104,97},
{110,103},{132,125},{146,139},{152,145},{162,155},{174,167},{180,173},{182,17
5},{186,179}}

{12,20,26,30,42,44,56,86,102,104,110,132,146,152,162,174,180,182,186}
{8,6,4,12,2,12,30,16,2,6,22,14,6,10,12,6,2,4} THE DISTANCE BTWEEN
EVERY ORDERED PAIR THAT GIVES A PRIME GIVES BY SUM THE NEXT
ODD NUMBER IN THE PAIRS
{5,13,19,23,35,37,49,79,95,97,103,125,139,145,155,167,173,175,179}

8+5=13 ,13+6=19,19+4=23,23+12=35 AND SO ON

AND FINALLY WRITTEN IN PORTUGUESE AND FOR THE SAKE OF
IDENTITY THE CONJECTURE THAT SEEMS TO HOLD TRUE :

{{12,5},{20,13},{26,19},{30,23},{42,35},{44,37},{56,49},{86,79},{102,95},{104,97},{110,103},{132,125},{146,139},{152,145},{162,155},{174,167},{180,173},{182,175},{186,179}} a Soma consecutiva dos pares dos pares ordenados menos a soma consecutiva dos impares progressivamente dá múltiplos consecutivos de 7....

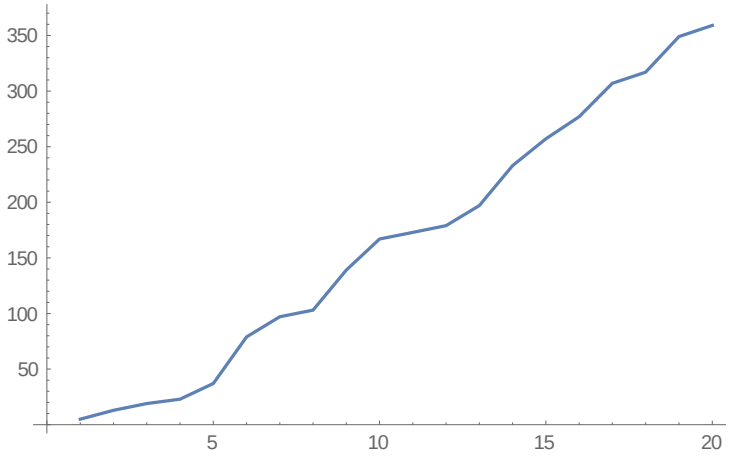


pairs={{12,5},{20,13},{26,19},{30,23},{42,35},{44,37},{56,49},{86,79},{102,95},{104,97},{110,103},{132,125},{146,139},{152,145},{162,155},{174,167},{180,173},{182,175},{186,179},{194,187},{

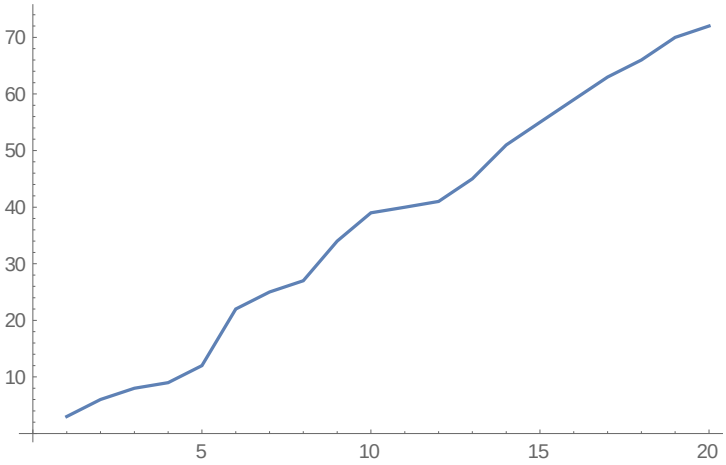
204,197},{210,203},{216,209},{240,233},{254,247},{260,253},{264,257},{272,265},{284,277},{302,295},{312,305},{314,307},{324,317},{326,319},{330,323},{336,329},{356,349},{362,355},{366,359},{380,373},{384,377},{386,379},{390,383},{404,397},{410,403},{422,415},{446,439},{456,449},{462,455},{470,463},{480,473},{482,475}}

```
list = pairs[[All, 1]]

list2=pairs[[All,2]]

list3=Drop[list2,2]

pairs = Table[{list[[i]], list[[i + 2]]}, {i, 1, Length[list] - 2}];

sums = Map[Total, pairs];

sums

division=sums/2

list3-division

PrimeQ[list2]

a=Select[list2,PrimeQ,(20)]

ListLinePlot[a]

PrimePi[a]

ListLinePlot[%]
```

{5,13,19,23,37,79,97,103,139,167,173,179,197,233,257,277,307,317,349,359}



{3,6,8,9,12,22,25,27,34,39,40,41,45,51,55,59,63,66,70,72}



pairs={{12,5},{20,13},{26,19},{30,23},{42,35},{44,37},{56,49},{86,79},{102,95},{104,97},{110,103},{132,125},{146,139},{152,145},{162,155},{174,167},{180,173},{182,175},{186,179},{194,187},{204,197},{210,203},{216,209},{240,233},{254,247},{260,253},{264,257},{272,265},{284,277},{302,295},{312,305},{314,307},{324,317},{326,319},{330,323},{336,329},{356,349},{362,355},{366,359},{380,373},{384,377},{386,379},{390,383},{404,397},{410,403},{422,415},{446,439},{456,449},{462,455},{470,463},{480,473},{482,475},{512,505},{516,509},{522,515},{524,517},{536,529},{540,533},{554,547},{560,553},{594,587}}

list = pairs[[All, 1]]

list2=pairs[[All,2]]

list3=Drop[list2,2]

pairs = Table[{list[[i]], list[[i + 2]]}, {i, 1, Length[list] - 2}];

sums = Map[Total, pairs];

sums

division=sums/2

list3-division

PrimeQ[list2]

a=Select[list2,PrimeQ,(60)]

ListLinePlot[a] 1)

PrimePi[a]

ListLinePlot[%] 2)

series = {3,6,8,9,12,22,25,27,34,39,40,41,45,51,55,59,63,66,70,72,74,75,76,78,85,87,90,97,101,107}

pairs = Table[series[[i]] + series[[Length[series] - i + 1]], {i, 1, Floor[Length[series]/2]}]

ListLinePlot[pairs]

po = Table[pairs[[i]] + pairs[[Length[pairs] - i + 1]], {i, 1, Floor[Length[pairs]/2]}]

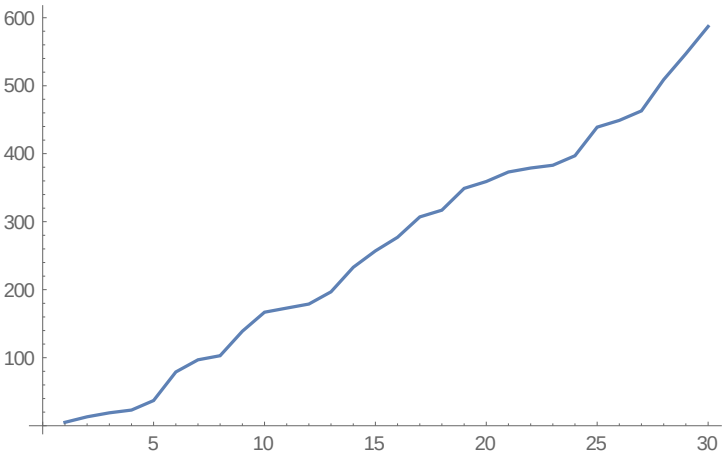
ListLinePlot[pairs]

de=a-(series*2)

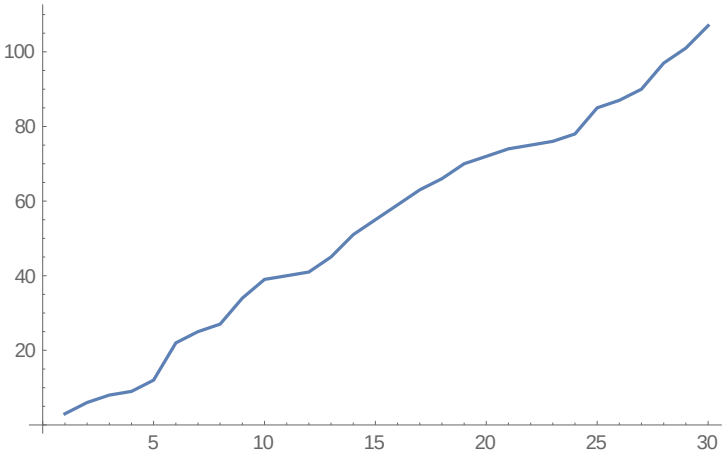
PrimeQ[de]

ListLinePlot[de] 3)

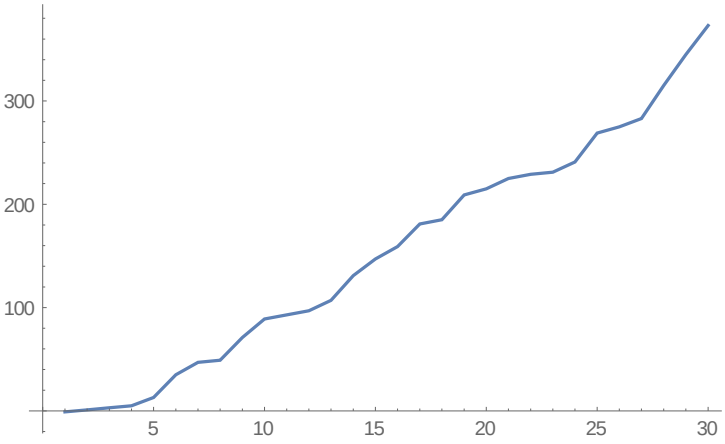
1)



2)



3)



The following program algorith checks if there is other forms of pairs that satisfy a certain pattern: Please use a translator to convert the texts in to english as it was originally formulated in portuguese.

```
(* Definindo os pares ordenados *)

pairs = {{12, 5}, {20, 13}, {26, 19}, {30, 23}, {42, 35}, {44, 37}, {56, 49}, {86, 79}, {102, 95}, {104, 97}};

(* Função para verificar a propriedade *)verificarPropriedade[pairs_List] := Module[{n, i, par1, impar1, par2, impar2, soma1, soma2, resultado},  n = Length[pairs];

resultado = True;  For[i = 1, i <= Floor[n/2], i++,    par1 = pairs[[i, 1]];    impar1 = pairs[[i, 2]];  par2 = pairs[[n - i + 1, 1]];

impar2 = pairs[[n - i + 1, 2]];

soma1 = par1 + impar2;

soma2 = impar1 + par2;

If[soma1 != soma2,      resultado = False;      Break[];    ];  ];  resultado]

(* Verificando a propriedade *)verificarPropriedade[pairs]

True
```

PROGRAM 2

```
pairs = {{12, 5}, {20, 13}, {26, 19}, {30, 23}, {42, 35}, {44, 37}, {56, 49}, {86, 79}, {102, 95}, {104, 97}};

(* Função para verificar a propriedade *)verificarPropriedade[pairs_List] := Module[{n, i, par1, impar1, par2, impar2, soma1, soma2, resultado},  n = Length[pairs];

resultado = True;

For[i = 1, i <= Floor[n/2], i++,    par1 = pairs[[i, 1]];    impar1 = pairs[[i, 2]];    par2 = pairs[[n - i + 1, 1]];

impar2 = pairs[[n - i + 1, 2]];

soma1 = par1 + impar2;

soma2 = impar1 + par2;

If[soma1 != soma2,      resultado = False;      Break[];    ];  ];  resultado]

(* Verificando a propriedade *)verificarPropriedade[pairs]
```

```
(* Modificando os pares para garantir somas únicas *)modificarPares[pairs_List] := Module[{n, i, novoPar},  n = Length[pairs];  Table[    novoPar = {pairs[[i, 1]], pairs[[i, 2]]};  While[MemberQ[Table[pairs[[j, 1]] + pairs[[n - j + 1, 2]], {j, 1, Floor[n/2]}], novoPar[[1]] + novoPar[[2]]],      novoPar = {novoPar[[1]] + 2, novoPar[[2]] + 2};    ];    novoPar,    {i, 1, n}  ]]

(* Modificando os pares *)paresModificados =modificarPares[pairs];

(* Verificando a propriedade nos pares modificados *)

verificarPropriedade(paresModificados)

(* Exibindo os pares modificados *)paresModificados

True

{{12 verificarPropriedade,5 verificarPropriedade},{20 verificarPropriedade,13 verificarPropriedade},{26 verificarPropriedade,19 verificarPropriedade},{30 verificarPropriedade,23 verificarPropriedade},{42 verificarPropriedade,35 verificarPropriedade},{44 verificarPropriedade,37 verificarPropriedade},{60 verificarPropriedade,53 verificarPropriedade},{86 verificarPropriedade,79 verificarPropriedade},{102 verificarPropriedade,95 verificarPropriedade},{104 verificarPropriedade,97 verificarPropriedade}}

{{12,5},{20,13},{26,19},{30,23},{42,35},{44,37},{60,53},{86,79},{102,95},{104,97}}


nn = Range[1, 10000000];n = Select[nn, PrimeQ, (1000)];

k = (n^2) - 1 + n + (2 - 4 n);d = n^4 - 1 + n^2;c = n^3 + 2;e = Mod[c, 3];

f = Mod[d, 3];

g = Mod[k, 3];

h = Mod[c, 7];

i = Mod[d, 7];

j = Mod[k, 7];

l = Mod[c, 4];

m = Mod[d, 4];

o = Mod[k, 4];

r = Mod[c, 5];

s = Mod[d, 5];

t = Mod[k, 5];

QQ = Transpose[{e, f, g, h, i, j, l, m, o, r, s, t}];

validNumbers = Select[Range[7963, 8050],   Module[{n2 = #, k1, d1, c1, e1, f1, g1, h1, i1, j1, l1, m1, o1, r1, s1, t1, pp1},    k1 = (n2^2) - 1 + n2 + (2 - 4 n2);

  d1 = n2^4 - 1 + n2^2;
```

```
   c1 = n2^3 + 2;
    e1 = Mod[c1, 3];
     f1 = Mod[d1, 3];
       g1 = Mod[k1, 3];
        h1 = Mod[c1, 7];
         i1 = Mod[d1, 7];
          j1 = Mod[k1, 7];
           l1 = Mod[c1, 4];
            m1 = Mod[d1, 4];
             o1 = Mod[k1, 4];
              r1 = Mod[c1, 5];
                s1 = Mod[d1, 5];
                  t1 = Mod[k1, 5];
                    pp1 = {e1, f1, g1, h1, i1, j1, l1, m1, o1, r1, s1, t1};
                      MemberQ[QQ, pp1]  ] &];
                      validNumbers

oddNumbers = Select[validNumbers, OddQ];
validNumbers = Select[oddNumbers, Mod[2^#, #] == 2 &];

validNumbers
```

{7963,7967,7969,7979,7981,7982,7983,7985,7987,7991,7993,7997,7999,8003,8009,8011,8017,8021,8023,8027,8033,8039,8041,8047}

{7963,7993,8009,8011,8017,8039}

```
nn = Range[1, 10000000];ng=Select[nn,OddQ,(5000)];n = Select[ng, CompositeQ, (1000)];
k = (n^2) - 1 + n + (2 - 4 n);d = n^4 - 1 + n^2;c = n^3 + 2;e = Mod[c, 3];
f = Mod[d, 3];
g = Mod[k, 3];
```

```
h = Mod[c, 7];

i = Mod[d, 7];

j = Mod[k, 7];

l = Mod[c, 4];

m = Mod[d, 4];

o = Mod[k, 4];

r = Mod[c, 5];

s = Mod[d, 5];

t = Mod[k, 5];

QQ = Transpose[{e, f, g, h, i, j, l, m, o, r, s, t}];

validNumbers = Select[Range[7963, 8050],   Module[{n2 = #, k1, d1, c1, e1, f1, g1, h1, i1, j1, l1,
m1, o1, r1, s1, t1, pp1},    k1 = (n2^2) - 1 + n2 + (2 - 4 n2);

 d1 = n2^4 - 1 + n2^2;

  c1 = n2^3 + 2;

   e1 = Mod[c1, 3];

    f1 = Mod[d1, 3];

      g1 = Mod[k1, 3];

       h1 = Mod[c1, 7];

        i1 = Mod[d1, 7];

         j1 = Mod[k1, 7];

          l1 = Mod[c1, 4];

           m1 = Mod[d1, 4];

            o1 = Mod[k1, 4];

             r1 = Mod[c1, 5];

              s1 = Mod[d1, 5];

               t1 = Mod[k1, 5];

                pp1 = {e1, f1, g1, h1, i1, j1, l1, m1, o1, r1, s1, t1};

                 MemberQ[QQ, pp1]  ] &];

                 validNumbers


oddNumbers1 = Select[validNumbers, OddQ];
```

```
validNumbers = Select[oddNumbers1, Mod[2^#, #] == 2 &];


validNumbers

 nn = Range[1, 10000000];n = Select[nn, PrimeQ, (1000)];

k = (n^2) - 1 + n + (2 - 4 n);d = n^4 - 1 + n^2;c = n^3 + 2;e = Mod[c, 3];

f = Mod[d, 3];

g = Mod[k, 3];

h = Mod[c, 7];

i = Mod[d, 7];

j = Mod[k, 7];

l = Mod[c, 4];

m = Mod[d, 4];

o = Mod[k, 4];

r = Mod[c, 5];

s = Mod[d, 5];

t = Mod[k, 5];

QQ = Transpose[{e, f, g, h, i, j, l, m, o, r, s, t}];

validNumbers = Select[Range[7963, 8050],   Module[{n2 = #, k1, d1, c1, e1, f1, g1, h1, i1, j1, l1,
m1, o1, r1, s1, t1, pp1},    k1 = (n2^2) - 1 + n2 + (2 - 4 n2);

  d1 = n2^4 - 1 + n2^2;

    c1 = n2^3 + 2;

      e1 = Mod[c1, 3];

       f1 = Mod[d1, 3];

         g1 = Mod[k1, 3];

           h1 = Mod[c1, 7];

             i1 = Mod[d1, 7];

               j1 = Mod[k1, 7];

                 l1 = Mod[c1, 4];

                   m1 = Mod[d1, 4];

                     o1 = Mod[k1, 4];

                       r1 = Mod[c1, 5];
```

```
s1 = Mod[d1, 5];
t1 = Mod[k1, 5];
pp1 = {e1, f1, g1, h1, i1, j1, l1, m1, o1, r1, s1, t1};
MemberQ[QQ, pp1]  ] &];
validNumbers

oddNumbers = Select[validNumbers, OddQ];
validNumbers = Select[oddNumbers, Mod[2^#, #] == 2 &];

validNumbers
validNumbers2=Intersection[oddNumbers,oddNumbers1]
validNumbers = Select[validNumbers2, Mod[2^#, #] == 2 &]
validNumbers
```

{7963,7965,7967,7969,7971,7973,7975,7977,7979,7981,7983,7985,7987,7989,7991,7993,7995,7997,7999,8001,8003,8005,8007,8009,8011,8013,8015,8017,8019,8021,8023,8025,8027,8029,8031,8033,8035,8037,8039,8041,8043,8045,8047,8049}

{7963,7993,8009,8011,8017,8039}

{7963,7967,7969,7979,7981,7982,7983,7985,7987,7991,7993,7997,7999,8003,8009,8011,8017,8021,8023,8027,8033,8039,8041,8047}

{7963,7993,8009,8011,8017,8039}

{7963,7967,7969,7979,7981,7983,7985,7987,7991,7993,7997,7999,8003,8009,8011,8017,8021,8023,8027,8033,8039,8041,8047}

{7963,7993,8009,8011,8017,8039}

Now observe the following sequence of pairs that satisfy the rule stablished in RULE 1

```
pairs = {{12, 5}, {20, 13}, {26, 19}, {30, 23}, {42, 35}, {44, 37}, {56, 49}, {86, 79}, {102, 95}, {104, 97}, {110, 103}, {132, 125}, {146, 139}, {152, 145}, {162, 155}, {174, 167}, {180, 173}, {182, 175}, {186, 179}, {194, 187}, {204, 197}, {210, 203}, {216, 209}, {240, 233}, {254, 247}, {260, 253}, {264, 257}, {272, 265}, {284, 277}, {302, 295}, {312, 305}, {314, 307}, {324, 317}, {326, 319}, {330, 323}, {336, 329}, {356, 349}, {362, 355}, {366, 359}, {380, 373}, {384, 377}, {386, 379}, {390, 383}, {404, 397}, {410, 403}, {422, 415}, {446, 439}, {456, 449}, {462, 455}, {470, 463}, {480, 473}, {482, 475}, {512, 505}, {516, 509}, {522, 515}, {524, 517}, {536, 529}, {540, 533}, {554, 547}, {560, 553}, {594, 587}};
```

result = FoldList[#2 - 12 &, Last[pairs][[1]], Reverse[Most[pairs]][[All, 1]]]

a=Differences[result]

b=a*-1

c=Reverse[b]

numbers = c

result = FoldList[Plus, 12, numbers]

and then check for the results...

{594,548,542,528,524,512,510,504,500,470,468,458,450,444,434,410,398,392,378,374,372,368,354,350,344,324,318,314,312,302,300,290,272,260,252,248,242,228,204,198,192,182,174,170,168,162,150,140,134,120,98,92,90,74,44,32,30,18,14,8,0}

{-46,-6,-14,-4,-12,-2,-6,-4,-30,-2,-10,-8,-6,-10,-24,-12,-6,-14,-4,-2,-4,-14,-4,-6,-20,-6,-4,-2,-10,-2,-10,-18,-12,-8,-4,-6,-14,-24,-6,-6,-10,-8,-4,-2,-6,-12,-10,-6,-14,-22,-6,-2,-16,-30,-12,-2,-12,-4,-6,-8}

{46,6,14,4,12,2,6,4,30,2,10,8,6,10,24,12,6,14,4,2,4,14,4,6,20,6,4,2,10,2,10,18,12,8,4,6,14,24,6,6,10,8,4,2,6,12,10,6,14,22,6,2,16,30,12,2,12,4,6,8}

{8,6,4,12,2,12,30,16,2,6,22,14,6,10,12,6,2,4,8,10,6,6,24,14,6,4,8,12,18,10,2,10,2,4,6,20,6,4,14,4,2,4,14,6,12,24,10,6,8,10,2,30,4,6,2,12,4,14,6,46}

{8,6,4,12,2,12,30,16,2,6,22,14,6,10,12,6,2,4,8,10,6,6,24,14,6,4,8,12,18,10,2,10,2,4,6,20,6,4,14,4,2,4,14,6,12,24,10,6,8,10,2,30,4,6,2,12,4,14,6,46}

{12,20,26,30,42,44,56,86,102,104,110,132,146,152,162,174,180,182,186,194,204,210,216,240,254,260,264,272,284,302,312,314,324,326,330,336,356,362,366,380,384,386,390,404,410,422,446,456,462,470,480,482,512,516,522,524,536,540,554,560,606} these are the even parto f the pairs that satsify RULE 1. Subtract 7 from the even numbers and you get the odd parto f the oredered pairs.

Now just to clarify the number 914 used in the equation of z in RULE 1 comes from subtracting the 999th prime number from the multiplication of 7*999, which is 7907-(7*999)=914

pairs = {{12, 5}, {20, 13}, {26, 19}, {30, 23}, {42, 35}, {44, 37}, {56, 49}, {86, 79}, {102, 95}, {104, 97}, {110, 103}, {132, 125}, {146, 139}, {152, 145}, {162, 155}, {174, 167}, {180, 173}, {182, 175}, {186, 179}, {194, 187}, {204, 197}, {210, 203}, {216, 209}, {240, 233}, {254, 247}, {260, 253}, {264, 257}, {272, 265}, {284, 277}, {302, 295}, {312, 305}, {314, 307}, {324, 317}, {326, 319}, {330, 323}, {336, 329}, {356, 349}, {362, 355}, {366, 359}, {380, 373}, {384, 377}};

subtractFromEvens[pairs_List] :=

Flatten[If[EvenQ[#], # - 12, Nothing] & /@ pairs]

(Apply the function to the first element of each pair)

newList = subtractFromEvens[First /@ pairs];

(Output the new list of modified even numbers)

newList

a=Differences[newList]

b=a

c=Reverse[b]

numbers = b

result = FoldList[Plus, 12, numbers]

as=result+7907

PrimeQ[as]

rir=FoldList[Plus, 12, c]

ok=rir+7907

PrimeQ[ok]

Mod[2^ok,ok]

{0,8,14,18,30,32,44,74,90,92,98,120,134,140,150,162,168,170,174,182,192,198,204,228,242,248,252,260,272,290,300,302,312,314,318,324,344,350,354,368,372}

{8,6,4,12,2,12,30,16,2,6,22,14,6,10,12,6,2,4,8,10,6,6,24,14,6,4,8,12,18,10,2,10,2,4,6,20,6,4,14,4}

{8,6,4,12,2,12,30,16,2,6,22,14,6,10,12,6,2,4,8,10,6,6,24,14,6,4,8,12,18,10,2,10,2,4,6,20,6,4,14,4}

{4,14,4,6,20,6,4,2,10,2,10,18,12,8,4,6,14,24,6,6,10,8,4,2,6,12,10,6,14,22,6,2,16,30,12,2,12,4,6,8}

{8,6,4,12,2,12,30,16,2,6,22,14,6,10,12,6,2,4,8,10,6,6,24,14,6,4,8,12,18,10,2,10,2,4,6,20,6,4,14,4}

{12,20,26,30,42,44,56,86,102,104,110,132,146,152,162,174,180,182,186,194,204,210,216,240,254,260,264,272,284,302,312,314,324,326,330,336,356,362,366,380,384}

{7919,7927,7933,7937,7949,7951,7963,7993,8009,8011,8017,8039,8053,8059,8069,8081,8087,8089,8093,8101,8111,8117,8123,8147,8161,8167,8171,8179,8191,8209,8219,8221,8231,8233,8237,8243,8263,8269,8273,8287,8291}

{True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True,True}

{12,16,30,34,40,60,66,70,72,82,84,94,112,124,132,136,142,156,180,186,192,202,210,214,216,222,234,244,250,264,286,292,294,310,340,352,354,366,370,376,384}

{7919,7923,7937,7941,7947,7967,7973,7977,7979,7989,7991,8001,8019,8031,8039,8043,8049,8063,8087,8093,8099,8109,8117,8121,8123,8129,8141,8151,8157,8171,8193,8199,8201,8217,8247,8259,8261,8273,8277,8283,8291}

{True,False,True,False,False,False,False,False,False,False,False,False,False,True,False,False,False,True,True,False,False,True,False,True,False,False,False,False,True,False,False,False,False,False,False,False,True,False,False,True}

{2,6734,2,8,512,6297,6339,8,6708,8,2841,890,4373,8,2,5972,8,4980,2,2,6416,3041,2,8,2,3526,2454,6833,8,2,8,512,5947,2339,8,8,2048,2,6173,8027,2}

(Define the ordered pairs)

orderedPairs = {{12, 5}, {20, 13}, {26, 19}, {30, 23}, {42, 35}, {44, 37}, {56, 49}, {86, 79}, {102, 95}, {104, 97}, {110, 103}, {132, 125}, {146, 139}, {152, 145}, {162, 155}, {174, 167}, {180, 173}, {182, 175}, {186, 179}};

(Extract the first and second elements of the pairs)

firstElements = orderedPairs[[All, 1]];

secondElements = orderedPairs[[All, 2]];

(Calculate the differences and check for primes)

differences = firstElements + secondElements;

isPrime = PrimeQ /@ differences;

(Generate the next odd numbers based on the second elements)

nextOddNumbers = secondElements + 2 Range[Length[secondElements]]

(Check the sums and find the primes)

primeSums = Select[Differences, PrimeQ];

(Conjecture: Consecutive sums of ordered pairs minus consecutive sums of odd numbers gives multiples of 7)

consecutiveSums = Accumulate[firstElements] - Accumulate[nextOddNumbers];

multiplesOf7 = Mod[consecutiveSums, 7] == 0

(Output results)

Print["Ordered Pairs: ", orderedPairs];

Print["Differences: ", differences];

Print["Are Differences Prime? ", isPrime];

Print["Next Odd Numbers: ", nextOddNumbers];

Print["Prime Sums: ", primeSums];

Print["Conjecture Results (Multiples of 7): ", multiplesOf7];

Finally a pattern : Conjecture:7 consecutive Consecutive gives minus multiples numbers odd of^3 ordered pairs sums^2

{5,1,2,1,5,0,0,5,1,2,1,5,0,0,5,1,2,1,5}==0

a={5,8,9,8,5,0,-7,-16,-27,-40,-55,-72,-91,-112,-135,-160,-187,-216,-247}
Mod[a,7]= {5,1,2,1,5,0,0,5,1,2,1,5,0,0,5,1,2,1,5}==0

Given Resuts

Out[23]= Define ordered pairs the

Out[25]= and elements Extract first of pairs second the^2

Out[28]= {17 and Calculate check for primes the,33 and Calculate check for primes the,45 and Calculate check for primes the,53 and Calculate check for primes the,77 and Calculate check for primes the,81 and Calculate check for primes the,105 and Calculate check for primes the,165 and Calculate check for primes the,197 and Calculate check for primes the,201 and Calculate check for primes the,213 and Calculate check for primes the,257 and Calculate check for primes the,285 and Calculate check for primes the,297 and Calculate check for primes the,317 and Calculate check for primes the,341 and Calculate check for primes the,353 and Calculate check for primes the,357 and Calculate check for primes the,365 and Calculate check for primes the}

Out[31]= based elements Generate next numbers odd on second the^2

Out[32]= {7,17,25,31,45,49,63,95,113,117,125,149,165,173,185,199,207,211,217}

Out[33]= and Check find primes sums the^2

During evaluation of In[23]:= Select::normal: Nonatomic expression expected at position 1 in Select[Differences,PrimeQ].

Out[35]= Conjecture:7 consecutive Consecutive gives minus multiples numbers odd of^3 ordered pairs sums^2

Out[36]= {5,8,9,8,5,0,-7,-16,-27,-40,-55,-72,-91,-112,-135,-160,-187,-216,-247}

Out[37]= {5,1,2,1,5,0,0,5,1,2,1,5,0,0,5,1,2,1,5}==0

Out[38]= Output results

During evaluation of In[23]:= Ordered Pairs:
{{12,5},{20,13},{26,19},{30,23},{42,35},{44,37},{56,49},{86,79},{102,95},{104,97},{110,103},{132,125},{146,139},{152,145},{162,155},{174,167},{180,173},{182,175},{186,179}}

During evaluation of In[23]:= Differences:
{17,33,45,53,77,81,105,165,197,201,213,257,285,297,317,341,353,357,365}

During evaluation of In[23]:= Are Differences Prime?
{True,False,False,True,False,False,False,False,True,False,False,True,False,False,True,False,True,False,False}

During evaluation of In[23]:= Next Odd Numbers:
{7,17,25,31,45,49,63,95,113,117,125,149,165,173,185,199,207,211,217}

During evaluation of In[23]:= Prime Sums: Select[Differences,PrimeQ]

During evaluation of In[23]:= Conjecture Results (Multiples of 7):
{5,1,2,1,5,0,0,5,1,2,1,5,0,0,5,1,2,1,5}==0

A expressão `nextOddNumbers = secondElements + 2 Range[Length[secondElements]]` no contexto fornecido está gerando uma lista de números ímpares subsequentes com base nos elementos da lista `secondElements`.

Aqui está uma explicação detalhada:

1. `secondElements`: Esta é uma lista que contém o segundo elemento de cada par ordenado. Por exemplo, se `orderedPairs` é `{{12, 5}, {20, 13}, {26, 19}, ...}`, então `secondElements` será `{5, 13, 19, ...}`.
2. `Range[Length[secondElements]]`: Esta função gera uma lista de inteiros de 1 até o comprimento de `secondElements`. Se `secondElements` tem 3 elementos, `Range[3]` será `{1, 2, 3}`.
3. `2 Range[Length[secondElements]]`: Multiplica cada elemento da lista gerada por `Range` por 2. Então, se `Range[3]` é `{1, 2, 3}`, `2 Range[3]` será `{2, 4, 6}`.
4. `secondElements + 2 Range[Length[secondElements]]`: Adiciona cada elemento da lista `secondElements` ao correspondente elemento da lista `2 Range[Length[secondElements]]`. Por exemplo, se `secondElements` é `{5, 13, 19}` e `2 Range[3]` é `{2, 4, 6}`, então `nextOddNumbers` será `{5+2, 13+4, 19+6}`, resultando em `{7, 17, 25}`.

Portanto, `nextOddNumbers` é uma lista de números ímpares subsequentes gerados a partir dos elementos de `secondElements`.