```
\\ search in the text file list_fano_ge3.out for Q-Fanos X of Fano index q=qW(X)\ge 3
\\ allocatemem(s=100000000);
infty=10^8;

FANO_INDEX_MIN=11;
FANO_INDEX_MAX=11;
("FANO_INDEX_MIN \\le qW(X) \\le FANO_INDEX_MAX ");

DIM_K_MIN=-1;
DIM_K_MAX=infty;
("DIM_K_MIN\\le dim |-K_X|\\le DIM_K_MAX");

DIM_A_MIN=-1;
DIM_A_MAX=infty;
("DIM_A_MIN\\le dim |A|\\le DIM_A_MAX");

DEGREE_MIN= 0;
DEGREE_MAX= 125/2;
("DEGREE_MIN\le -K^3 \\ le DEGREE_MAX");

LENGTH_OF_BASKET_MIN=0;
LENGTH_OF_BASKET_MAX=infty;
\\ LENGTH_OF_BASKET -- the length of the basket, should be \le 15


KAWAMATA_BOGOMOLOV_BOUND_CHECK=0;
\\ check Kawamata-Bogomolov bound?
\\ if KAWAMATA_BOGOMOLOV_BOUND_CHECK=0, then Kawamata-Bogomolov bound will be not checked
\\ otherwise KAWAMATA_BOGOMOLOV_BOUND_CHECK= 1 , 2, 3
\\ put KAWAMATA_BOGOMOLOV_BOUND_CHECK=1 if  qW(X)=qQ(X)
\\ put KAWAMATA_BOGOMOLOV_BOUND_CHECK=2  if  qW(X)\neq qQ(X)
\\ put KAWAMATA_BOGOMOLOV_BOUND_CHECK=3  in general
INDEX_FANO_MAXXX=50;
INDEX_FANO_SET=Set({[3,4,5,6,7,8,9,10,11,13,17,19]});
N_INDEX_FANO_SET=matsize(INDEX_FANO_SET)[2];
INDEX_FANO_MAX=0;
for (i=1, N_INDEX_FANO_SET, INDEX_FANO_MAX=max(INDEX_FANO_MAX, eval(INDEX_FANO_SET[i])););
\\this is to check Kawamata-Bogomolov bound
\\ we use t\ge 1/qQ
\\ where qW divides qQ and   qQ in INDEX_FANO_SET



p=1;
SUM_MIN=-infty;
("(\sum indices divisible by p) \ge  SUM_MIN");

{
TEST=1; \\ for correct data
print("-----------------------------------------");
print("search for Q-Fanos X satisfying the following conditions:");

if (TEST && FANO_INDEX_MIN<>FANO_INDEX_MAX &&  FANO_INDEX_MIN<>-infty && FANO_INDEX_MAX<> infty,
print1(FANO_INDEX_MIN); print1(" \\le index Fano \\le "); print(FANO_INDEX_MAX););
if (TEST && FANO_INDEX_MIN<>FANO_INDEX_MAX &&  FANO_INDEX_MIN<>-infty && FANO_INDEX_MAX== infty,
print1(FANO_INDEX_MIN); print(" \\le index Fano"););
if (TEST && FANO_INDEX_MIN<>FANO_INDEX_MAX &&  FANO_INDEX_MIN==-infty && FANO_INDEX_MAX<> infty,
print1("index Fano \\le "); print(FANO_INDEX_MAX););
if (TEST && FANO_INDEX_MIN<>FANO_INDEX_MAX && FANO_INDEX_MIN==-infty && FANO_INDEX_MAX== infty, );
if (TEST && FANO_INDEX_MIN==FANO_INDEX_MAX,  print1("index Fano= ");  print(FANO_INDEX_MAX););
if ( FANO_INDEX_MIN>FANO_INDEX_MAX,  print("WRONG DATA FOR index Fano"); TEST=0;);

if (TEST && DEGREE_MIN<> -infty && DEGREE_MAX<> infty, print1(DEGREE_MIN); print1(" \\le -K_X^3 \\le ");
```

```
print(DEGREE_MAX););
if (TEST && DEGREE_MIN== -infty && DEGREE_MAX<> infty, print1(" -K_X^3 \\le "); print(DEGREE_MAX););
if (TEST && DEGREE_MIN<> -infty && DEGREE_MAX== infty, print1(DEGREE_MIN); print(" \\le -K_X^3 "); );
if (TEST && DEGREE_MIN== -infty && DEGREE_MAX== infty,);
if (DEGREE_MIN > DEGREE_MAX, print(" WRONG DATA FOR -K_X^3 !!!"); TEST=0;);

if (TEST && DIM_K_MIN<>-infty &&  DIM_K_MAX<> infty && DIM_K_MIN<> DIM_K_MAX, print1(DIM_K_MIN);
print1(" \\le dim |-K_X| \\le "); print(DIM_K_MAX););
if (TEST && DIM_K_MIN<>-infty &&  DIM_K_MAX<> infty && DIM_K_MIN= DIM_K_MAX, print1("dim |-K_X| = ");
print(DIM_K_MAX););
if (TEST && DIM_K_MIN==-infty &&  DIM_K_MAX<> infty&&  DIM_K_MAX<> -infty, print1(" dim |-K_X| \\le ");
print(DIM_K_MAX););
if (TEST && DIM_K_MIN<>-infty &&  DIM_K_MAX== infty, print1(DIM_K_MIN); print(" \\le dim |-K_X|"); );
if (TEST && DIM_K_MIN==-infty &&  DIM_K_MAX== infty,);
if (TEST && DIM_K_MIN==-infty &&  DIM_K_MAX== -infty, print(" dim |-K_X| -infty"); );
if ( DIM_K_MIN> DIM_K_MAX, print(" WRONG DATA FOR dim |-K_X| !!!"); TEST=0;);

if (TEST && DIM_A_MIN<>-infty && DIM_A_MAX<> infty && DIM_A_MIN= DIM_A_MAX, print1("dim |A|= ");
print(DIM_A_MAX););
if (TEST && DIM_A_MIN<>-infty && DIM_A_MAX<> infty && DIM_A_MIN<> DIM_A_MAX, print1(DIM_A_MIN); print1("
\\le dim |A| \\le "); print(DIM_A_MAX););
if (TEST && DIM_A_MIN==-infty && DIM_A_MAX<> infty && DIM_A_MAX<> -infty , print1(" dim |A| \\le ");
print(DIM_A_MAX););
if (TEST && DIM_A_MIN<>-infty && DIM_A_MAX== infty, print1(DIM_A_MIN); print(" \\le dim |A| "););
if (TEST && DIM_A_MIN==-infty && DIM_A_MAX== infty, );
if (TEST && DIM_A_MIN==-infty && DIM_A_MAX== -infty, print(" dim |A| = -infty"););
if ( DIM_A_MIN> DIM_A_MAX, print(" WRONG DATA FOR dim |A| !!!"); TEST=0;);

if (TEST && LENGTH_OF_BASKET_MIN <>-infty && LENGTH_OF_BASKET_MAX <> infty,
print1(LENGTH_OF_BASKET_MIN); print1("\\le  (length of the basket)\\le  "); print(LENGTH_OF_BASKET_MAX);
);
if (TEST && LENGTH_OF_BASKET_MIN ==-infty && LENGTH_OF_BASKET_MAX <> infty, print1(" (length of the
basket)\\le  "); print(LENGTH_OF_BASKET_MAX); );
if (TEST && LENGTH_OF_BASKET_MIN <>-infty && LENGTH_OF_BASKET_MAX == infty,
print1(LENGTH_OF_BASKET_MIN); print("\\le  (length of the basket)");  );
if (TEST && LENGTH_OF_BASKET_MIN ==-infty && LENGTH_OF_BASKET_MAX == infty,);
if (LENGTH_OF_BASKET_MIN> LENGTH_OF_BASKET_MAX, print(" WRONG DATA FOR length of the basket!!!");
TEST=0;);


if (TEST && KAWAMATA_BOGOMOLOV_BOUND_CHECK==2, print("Kawamata-Bogomolov bound is checked"););
if (TEST && KAWAMATA_BOGOMOLOV_BOUND_CHECK==1, print("Kawamata-Bogomolov bound is checked assuming
qW=qQ"););
if (TEST && KAWAMATA_BOGOMOLOV_BOUND_CHECK==0, print("Kawamata-Bogomolov bound is NOT checked"););
if (TEST && KAWAMATA_BOGOMOLOV_BOUND_CHECK==3, print("Kawamata-Bogomolov bound is  checked assuming
..."););
if ((KAWAMATA_BOGOMOLOV_BOUND_CHECK>3 || KAWAMATA_BOGOMOLOV_BOUND_CHECK<0),
print("KAWAMATA_BOGOMOLOV_BOUND_CHECK sould be 0,1,  2, or 3");   TEST=0;);


if (SUM_MIN<> -infty, print1(SUM_MIN); print1(" \\le (\sum indices divisible by  "); print1(p);
print(")"););
if (TEST,
schetchik=0;

NN=matsize(readvec("list_fano_ge3.out"))[2];
\\ allocatemem(s=90000000);
for(i=1,NN,

FANO=readvec("list_fano_ge3.out")[i];

BASKET=FANO[1];
```

```
GGI=FANO[2];
q=FANO[3];
A3=FANO[4];
Ac=FANO[5];
dimtAc=FANO[6];
LENGTH=FANO[7];


\\ [BASKET,GGI ,q, A3, Ac, dimtAc, LENGTH]

INDEX=vector(LENGTH, i, BASKET[i][1]);
WEIGHT=vector(LENGTH, i, BASKET[i][2]);
\\ WEIGHT[i] is the number b in [Reid, YPG]
\\ i.e. the quotient has the form 1/r(1,-1,b), where r=INDEX[i]
dim_A=dimtAc[1];
dim_K=dimtAc[q];

Kc=q*Ac;
K3=q^3*A3;


 TEST1=1;
 TEST1= TEST1 && (q<=FANO_INDEX_MAX);
 TEST1= TEST1 && (q>=FANO_INDEX_MIN);
 TEST1= TEST1 && (K3<=DEGREE_MAX);
 TEST1= TEST1 && (K3>=DEGREE_MIN);
 TEST1= TEST1 && (LENGTH_OF_BASKET_MIN<=LENGTH);
 TEST1= TEST1 && (LENGTH_OF_BASKET_MAX>=LENGTH);
 TEST1= TEST1 && (dim_A<= DIM_A_MAX);
 TEST1= TEST1 && (dim_A>= DIM_A_MIN);
 TEST1= TEST1 && (dim_K<= DIM_K_MAX);
 TEST1= TEST1 && (dim_K>= DIM_K_MIN);

if(TEST1,


boool=1;
if (p<>1,
SUM_INDICES=0;
for(i=1,LENGTH, if((INDEX[i]%p)==0, SUM_INDICES=SUM_INDICES+INDEX[i];) );
boool= boool &&  SUM_INDICES>=SUM_MIN;);


\\ check Kawamata-Bogomolov bound
if (KAWAMATA_BOGOMOLOV_BOUND_CHECK>0,
qQ=q;

if (KAWAMATA_BOGOMOLOV_BOUND_CHECK==2,
for (i=1,INDEX_FANO_MAX, if((i%q)==0 && setsearch(INDEX_FANO_SET,i), qQ=max(i,qQ);); );
);

if (KAWAMATA_BOGOMOLOV_BOUND_CHECK==3,
for (i=1,INDEX_FANO_MAXXX, if((i%q)==0 && i<=INDEX_FANO_MAXXX, qQ=max(i,qQ);); );
);

bogomolov=0;
bogomolov=bogomolov || (K3<=3*Kc);
bogomolov=bogomolov || (((1/qQ)*(4-3/qQ)*K3<=4*Kc));
bogomolov=bogomolov || (((1-1/qQ)*(1+3/qQ)*K3<=4*Kc));
bogomolov=bogomolov || (((1/qQ)*(2-3/qQ)*K3<=Kc));
boool = (boool && bogomolov);
);
```

```
 if(boool,
print("----------------------------------------");
schetchik=schetchik+1;
\\ print the result

printp1("Q-Fano No. "); print(schetchik);
\\ printp1("LENGTH="); print(LENGTH);
printp1("qW(X)="); print(q);
printp1("BASKET="); printp(BASKET);

\\ WEIGHT_A is the weight of the generator
\\ i.e.  A\sim WEIGHT_A[i] K_X    near P_i and  0\le WEIGHT_A[i]<r
WEIGHT_A=vector(LENGTH,i, (-(bezout(q,INDEX[i])[1])) %INDEX[i]);
\\ printp1("WEIGHT_A="); printp(WEIGHT_A);

print1("INDICES="); print(INDEX);
printp1("A^3="); print(A3);



\\ print dim |tA|
for (t=1,q,
printp1(" dim |"); print1(t); print1("A|="); print(dimtAc[t]);
);


);
);
);

print("----------------------------------------");
print1(schetchik); print(" matching Q-Fanos found");
,  print("WRONG DATA !!!!!!!!!!!!!!"););
}
```