```
aRandStep2D :=proc(X0, Y0, deltaX, deltaY)
  local X, Y, P, R;
  P := Array(1..2);
  R := rand(1..8)( );
  if R=1 then X := X0 - deltaX; Y := Y0 + deltaY; fi;
  if R=2 then X := X0; Y := Y0 + deltaY; fi;
  if R=3 then X := X0 + deltaX; Y := Y0 + deltaY; fi;
  if R=4 then X := X0 - deltaX; Y := Y0; fi;
  if R=5 then X := X0 + deltaX; Y := Y0;fi;
  if R=6 then X := X0 - deltaX; Y := Y0 - deltaY;fi;
  if R=7 then X := X0; Y := Y0 - deltaY;fi;
  if R=8 then X := X0 + deltaX; Y := Y0 - deltaY;fi;
  P[1] := X;   P[2] := Y;
 return P;
 end proc
```

```
aRandStep2D := proc(X0, Y0, deltaX, deltaY)
   local X, Y, P, R;
   P := Array(1..2);
   R := rand(1..8)( );
   if R=1 then X := X0 - deltaX; Y := Y0 + deltaY end if;
   if R=2 then X := X0; Y := Y0 + deltaY end if;
   if R=3 then X := X0 + deltaX; Y := Y0 + deltaY end if;
   if R=4 then X := X0 - deltaX; Y := Y0 end if;
   if R=5 then X := X0 + deltaX; Y := Y0 end if;
   if R=6 then X := X0 - deltaX; Y := Y0 - deltaY end if;
   if R=7 then X := X0; Y := Y0 - deltaY end if;
   if R=8 then X := X0 + deltaX; Y := Y0 - deltaY end if;
   P[1] := X;
   P[2] := Y;
   return P
end proc
```

(1)

```
SetStart :=proc(b)
local alpha, R, P;
 P := Array(1..2);
 alpha := rand(1..b)( );
 P[1] := alpha·b;
 P[2] := alpha·b;
 return P;
 end proc
```

```
SetStart := proc(b)
   local alpha, R, P;
```

(2)

```
    P := Array(1..2);
    alpha := rand(1..b)();
    P[1] := alpha*b;
    P[2] := alpha*b;
    return P
end proc

RandomFactTpq :=proc(N, pb, dx, dy)
local alpha, X, Y, f, P, counter, B, n, T;
   P := Array(1..2);#using Array
   counter := 0; f := 1;
   B := floor(evalf(√N));#maximal walking steps
   T := floor(evalf(√N));
   P := SetStart(T);
   X := P[1]; Y := P[2];

  while(f=1 and counter < B ) do

   n := pb - X - Y;
   f := gcd(N, n);
   if f > 1 then break fi;

    P := aRandStep2D(X, Y, dx, dy);
    X := P[1]; Y := P[2];

    if X < 1 or Y < 1 or X > N - pb - 1 or Y ≥ X then
     P := SetStart(T);
     X := P[1]; Y := P[2];
    fi;
    counter := counter + 1;
 od;

   if f > 1 then
     print(Find at point (X, Y), found divisor=f, searching steps=counter);
   else print(This time finds no result, test again!); fi;

end proc
```

```
RandomFactTpq := proc(N, pb, dx, dy)                                    (3)
    local alpha, X, Y, f, P, counter, B, n, T;
    P := Array(1..2);
    counter := 0;
    f := 1;
    B := floor(evalf(sqrt(N)));
    T := floor(evalf(sqrt(N)));
```

```
    P := SetStart(T);
    X := P[1];
    Y := P[2];
    while f=1 and counter < B do
        n := pb - X - Y;
        f := gcd(N, n);
        if 1 < f then break end if;
        P := aRandStep2D(X, Y, dx, dy);
        X := P[1];
        Y := P[2];
        if X < 1 or Y < 1 or N - pb - 1 < X or X <= Y then
            P := SetStart(T); X := P[1]; Y := P[2]
        end if;
        counter := counter + 1
    end do;
    if 1 < f then
        print(Find*at*point*(X, Y), found*divisor=f, searching*steps=counter)
    else
        print(This*time*finds*no*result, test*factorial(again))
    end if
end proc
```

```
RandomFactTpq(49901, 150, 1, 1)
        Find at point (2230, 2229), found divisor=139, searching steps=77          (4)
RandomFactTpq(49901, 150, 1, 1)
       Find at point (17173, 17171), found divisor=139, searching steps=211        (5)
RandomFactTpq(49901, 150, 1, 1)
       Find at point (27875, 27875), found divisor=139, searching steps=141        (6)
RandomFactTpq(49901, 150, 1, 1)
       Find at point (16948, 16948), found divisor=359, searching steps=26         (7)
RandomFactTpq(49901, 150, 1, 1)
                    This time finds no result, test again!                        (8)
RandomFactTpq(567191, 700, 1, 1)
       Find at point (51960, 51955), found divisor=983, searching steps=436        (9)
RandomFactTpq(567191, 700, 1, 1)
      Find at point (405118, 405113), found divisor=577, searching steps=78       (10)
RandomFactTpq(567191, 700, 1, 1)
     Find at point (360687, 360686), found divisor=577, searching steps=243       (11)
RandomFactTpq(567191, 700, 1, 1)
```

Find at point (480414, 480414), *found divisor* = 577, *searching steps* = 157 **(12)**

RandomFactTpq(567191, 700, 1, 1)

This time finds no result, test again! **(13)**

RandomFactTpq(2425789, 1500, 2, 2)

Find at point (351976, 351828), *found divisor* = 1291, *searching steps* = 955 **(14)**

RandomFactTpq(2425789, 1500, 2, 2)

Find at point (2186028, 2186026), *found divisor* = 1879, *searching steps* = 496 **(15)**

RandomFactTpq(2425789, 1500, 2, 2)

Find at point (926471, 926323), *found divisor* = 1291, *searching steps* = 859 **(16)**

RandomFactTpq(2425789, 1500, 2, 2)

Find at point (2158020, 2158002), *found divisor* = 1291, *searching steps* = 177 **(17)**

RandomFactTpq(2425789, 1500, 2, 2)

Find at point (1077444, 1077444), *found divisor* = 1291, *searching steps* = 48 **(18)**

RandomFactTpq(75506467, 8500, 3, 3)

Find at point (53559017, 53559005), *found divisor* = 9739, *searching steps* = 2105 **(19)**

RandomFactTpq(75506467, 8500, 3, 3)

Find at point (58624683, 58624683), *found divisor* = 7753, *searching steps* = 3959 **(20)**

RandomFactTpq(75506467, 8500, 3, 3)

Find at point (27318333, 27317805), *found divisor* = 7753, *searching steps* = 5072 **(21)**

RandomFactTpq(75506467, 8500, 3, 3)

Find at point (16083339, 16083339), *found divisor* = 9739, *searching steps* = 5574 **(22)**

RandomFactTpq(75506467, 8500, 3, 3)

This time finds no result, test again! **(23)**

RandomFactTpq(826522877, 28000, 7, 7)

Find at point (693828366, 693828366), *found divisor* = 35323, *searching steps* = 22337 **(24)**

RandomFactTpq(826522877, 28000, 7, 7)

Find at point (152945149, 152944708), *found divisor* = 35323, *searching steps* = 20818 **(25)**

RandomFactTpq(826522877, 28000, 7, 7)

Find at point (624802626, 624802171), *found divisor* = 23399, *searching steps* = 27480 **(26)**

RandomFactTpq(826522877, 28000, 7, 7)

Find at point (144233740, 144233733), *found divisor* = 23399, *searching steps* = 474 **(27)**

RandomFactTpq(826522877, 28000, 7, 7)

This time finds no result, test again! **(28)**

RandomFactTpq(1231065553, 35000, 11, 11)

Find at point (495624803, 495624528), *found divisor* = 30853, *searching steps* = 16533 **(29)**

RandomFactTpq(1231065553, 35000, 11, 11)

Find at point (735472732, 735472732), *found divisor* = 39901, *searching steps* = 3899 **(30)**

RandomFactTpq(1231065553, 35000, 11, 11)

Find at point (432329780, 432329692), *found divisor* = 30853, *searching steps* = 1108 **(31)**

RandomFactTpq(1231065553, 35000, 11, 11)

Find at point (972689178, 972689178), *found divisor* = 30853, *searching steps* = 34389 **(32)**