GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 12, Issue 3, March (2024)

SCHOOL STUDENTS MATHEMATICS TO THE OLYMPICS IN PREPARATION NOT CLEAR EQUATIONS SOLVE METHODS TO TEACH

Akhmedova Gavhar Akhadovna
Kokan DPI Mathematics Department Big Teacher

Arabova Aziza Khan Abdugoppor daughter
Kokan DPI Student

ABSTRACT

This in the article school students mathematics to the Olympics in preparation not clear equations solve methods to teach about data given In this the first and second tree one with 2 variables equations to classes separated solve methods examples using showing given

Key words : not clear equation , solution , coefficient , modulus , natural number, prime number, even number, integer , system.

INTRODUCTION

From one more than unknowns own into receiver equation not clear equation is called Unknowns the number equations from number big has been equations system not clear equations system is called Uncertain equation infinite a lot to the solution have Usually not clear equations whole in numbers solutions is considered . First the first level 2 variable equations whole in numbers to solve seeing let's go Such of Eqs common appearance : $ax+by=c$ in appearance will be In this a,b,c - given numbers , x and y s only whole numbers acceptance who does are variables .

Example 1. This $5x-7y=3$ the equation whole in numbers take off

Solving . Unknowns inside the coefficient module is small found we can

$$5x=7y+3;\ \ x=\frac{7y+3}{5}$$

$$x=\frac{5y+(2y+3)}{5}=y+\frac{2y+3}{5}$$

$\frac{2y+3}{5}$ fraction whole to the thigh equal to to be need $\frac{2y+3}{5}=z,,\ \ z\in Z$. In that case $2y+3=5z.$ new 2 variable the first level equation harvest it has been . of this equation again by module coefficient small variable separate we get :

$$2y=5z-3,\ y=\frac{5z-3}{2}=\frac{6z-z-3}{2}=3z-\frac{z+3}{2}$$

This is the process of variables one's coefficient 1or $-1$to equal to until continue is enough

$$\frac{z+3}{2}=t,\ \ z+3=2t,\ \ z=2t-3,,t\in Z.$$

Now y and x the t through we express

$$y=3z-\frac{z+3}{2}=3(2t-3)-t=5t-9,$$

GALAXY INTERNATIONAL INTERDISCIPLINARY RESEARCH JOURNAL (GIIRJ)
ISSN (E): 2347-6915
Vol. 12, Issue 3, March (2024)

$x = y + \frac{2y+3}{5} = y + z = (5t-9) + (2t-3) = 7t-12$

We $x = 7t-12, y = 5t-9$ the formula harvest we do Given this formula of Eq whole in numbers everyone solutions to find enable will give . For example , t to 0,1 and 2 values giving , the equation private $(-12;-9)$, $(-5;-4)$, $(2;1)$ solutions harvest we do

Answer : $x = 7t-12, y = 5t-9$ $t \in Z$.

$ax + by = c$ in the equation , a, b, c - is given whole numbers for 2 the situation to be can :

1) This is an equation whole x and y in to the solution have it won't be . This is the case c number $|a|$ and $|b|$ of the most big common to the divisors when not divided will be

2) This is an equation whole in numbers infinite a lot to the solution have will be This is the case c the number $|a|$ and $|b|$ of the most big common to the divisors when divided or private without $|a|$ and $|b|$s when mutually radical will be

Sometimes such equations in natural numbers solve Demand will be done . In this equation whole in numbers will be solved and harvest has been solutions from the set of natural numbers solutions separate is taken .

Example 2. This $65x - 43y = 2$ equation in natural numbers take off

Solving . First the equation above saw our example solve method according to whole in numbers we solve . In this $x = 4 - 43t, y = 6 - 65t$.

Now x and y s positive to be t s we find

$$\begin{cases} 4 - 43t > 0, \\ 6 - 65t > 0 \end{cases}$$

From this $t < \frac{6}{65}$. This inequality everyone positive didn't happen t numbers satisfies .

Answer : $x = 4 - 43t, y = 6 - 65t, \quad t = 0, -1, -2, \ldots$

Now 2 variable 2 - graded equations whole in numbers to solve seeing let's go Such of Eqs common appearance as follows :

$ax^2 + bxy + cy^2 + dx + ey + f = 0$

In this a, b, c, d, e, f - given numbers , a, b, c of never when not one from scratch different That's six of coefficients all whole numbers let it be Such equations x and y whole in numbers to solve seeing let's go First of variables powers did not participate equations to solve let's look .

Example 3. This $xy = x + y$ the equation x and y whole in numbers take off

Solution. Method 1: y the x through we express

$$xy - y = x,\ y(x-1) = x,\ \ y = \frac{x}{x-1},\quad y = \frac{(x-1)+1}{x-1} = 1 + \frac{1}{x-1}$$

From this $x-1=1$ or $x-1=-1$. If $x-1=1$ if $x=2$, $y = 1+\frac{1}{1} = 2$. If $x-1=-1$ if $x=0$, $y = 1-\frac{1}{1} = 0$

Method 2. Given the equation

$xy - x - y = 0,\ x(y-1) - y = 0, x(y-1) - y + 1 = 1,\ (y-1)(x-1) = 1$

in appearance writing we can Two integer product to be 1 for their both of them1 or -1 to equal to to be need

$$\begin{cases} x-1=1, \\ y-1=1; \end{cases} \quad \begin{cases} x-1=-1, \\ y-1=-1. \end{cases}$$

First from the system $x=y=2$, second from the system $x=y=0$.

Answer :$(2;2),(0;0)$

Example 4. This $3xy+y=7x+3$ the equation take off

Solving . From Eq y the x through we express

$$y=\frac{7x+3}{3x+1}$$

of the fraction whole part separate for his each two side to 3 we multiply .

$$3y=\frac{21x+9}{3x+1}=\frac{(21x+7)+2}{3x+1}=7+\frac{2}{3x+1}$$

From this $3x+1$ only $-2,-1,1$ and 2 s acceptance to do can

Answer :$(0;3),(-1;2)$

Now the 2nd degree 2 variable , of the variables one square with participating equations to solve examples seeing we go out

Example 5. This $2x^2-2xy+9x+y=2$ the equation whole in numbers take off

Solving . In Eq only the first level with participating the unknown hurt we can

$$2x^2+9x-2=2xy-y,\ y=\frac{2x^2+9x-2}{2x-1}$$

The last one of the fraction whole part we separate . In this polynomial to many to be method we can also use :

$$y=x+5+\frac{3}{2x-1}$$

$2x-1$difference only $-3,-1,1$ and3 acceptance to do can

Answer :$(1;9),(2;8),(0;2),(-1;3)$.

Example 6. This $x^2+2xy=2002$ the equation whole in numbers take off

Solving . Eq the following to look cause we get :

$$(x+y)^2-y^2=2002$$

In this $x+y$ and of $y$couple oddities one different to be need But couple accuracy one different has been two squares the difference is 4 is divided , and 2002 is not divided .

Answer :Z in numbers taking off it won't be .

Now each both unknowns squares with attended equations to solve seeing let's go

7th isol. This $x^2-y^2=1997$ the equation whole in numbers take off

Solving . Eq the following in appearance writing we get :

$$(x+y)(x-y)=1997$$

1997 is a prime number for the following 4 cases to be can

$$\begin{cases} x+y=1997, \\ x-y=1; \end{cases} \quad \begin{cases} x+y=1, \\ x-y=1997; \end{cases} \quad \begin{cases} x+y=-1997, \\ x-y=-1; \end{cases} \quad \begin{cases} x+y=-1, \\ x-y=-1997. \end{cases}$$

These systems taking off of Eq the answer harvest we do

Answer : $(999;998),(999;-998),(-999;-998),(-999;998)$

Example 8. This $x^2-xy+y^2=x+y$ the equation whole in numbers take off

Solving . Above example when we untie used method with this the equation taking off it won't be . The equation everyone limits to the left passing x of degrees according to we place :

$x^2-(y+1)x+(y^2-y)=0$

The last one the equation to x relatively square equation by doing we solve . His the solution D to depends will be He is someone t whole of the thigh square to be need

$D=(y+1)^2-4(y^2-y)=t^2,\quad y^2+2y+1-4y^2+4y=t^2, -3y^2+6y+1=t^2$

We are new 2- graded 2 variable the equation harvest we did This is an equation given to Eq relatively is shorter. Eq everyone terms one towards passing

$3y^2-6y-1+t^2=0$

the equation harvest we do

$3(y^2-2y)-1+t^2=0,\ 3((y^2-2y+1)-1)-1+t^2=0,$

$3(y-1)^2-3-1+t^2=0,\ 3(y-1)^2+t^2=4.$

The last one from Eq $t^2\le 4,\ |t|\le 2.$ t of possible has been all values choose we solve .

1) If $t^2=0$ if , $3(y-1)^2=4$. This y of whole in value possible didn't happen is the case .

2) If $t^2=1$ if

$3(y-1)^2=3,\ (y-1)^2=1,\ y-1=\pm1;\ y_1=2,\ y_2=0$

$y=2$ the square to Eq let's put

$x^2-3x+2=0,\ x_1=1,\ x_2=2$

In this $(1;2)$ and $(2;2)$ solutions harvest we do Same so $y=0$ solutions at we find

$x^2-x=0;\ x_1=0,\ x_2=1$

In this $(0;0)$ and $(1;0)$ solutions harvest we do

3) If $t^2=4$ if

$3(y-1)^2=0,\ y=1$

$x^2-2x=0;\ x_1=0,\ x_2=2$

In this $(0;1)$ and $(2;1)$ solutions harvest we do

Answer : $(1;2),(2;2),(0;0),(1;0),(0;1),(2;1).$

Example 9. This $(x+y)^2=x-y$ the equation whole in numbers take off

Solving . $x+y=t, t\in Z$ if $x-y=t^2$ will be. As a result the following the system harvest we do

$$\begin{cases} x+y=t, \\ x-y=t^2. \end{cases}$$

Equations adding and minus $x=\frac{t(t+1)}{2};\ y=\frac{t(1-t)}{2}$ the harvest we do In this t optional whole numbers acceptance does it said to the question answer we give Harvest has been fractions whole are numbers because their photo is even . From this except found x and y s given to Eq let's say crime harvest will be So t optional is an integer , so for equation whole in numbers infinite a lot to the solution have

REFERENCES

1. Sh.N. Ismailov. "Number theory" - Tashkent, "Teacher" NMIU, 2008.
2. AS Yunusov, SIAfonina and others "Interesting mathematics and Olympiad issues" Study guide for academic lyceums, vocational colleges. Tashkent "Teacher", 2007
3. E.V. Perhaps. "Nestandartnye zadachi po matematike. Algebra". Chelyabinsk "Vzglyad", 2004 г.
4. I.F. Sharygin . " Optional course in mathematics " 10th grade. Moscow " Enlightenment ", 1989 г.