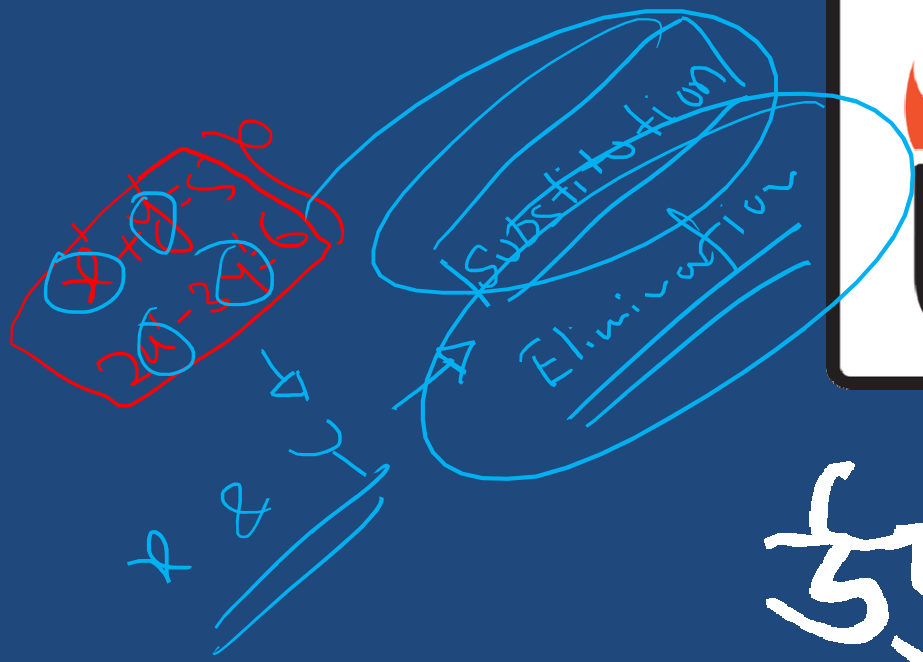
بِسْمِ اللهِ الرَّحْمٰنِ الرَّحِيْمِ

বিস্‌মিল্লাহির রাহ্‌মানির রাহীম



উদ্ভাস

একাডেমিক এন্ড এডমিশন কেয়ার

Previous Homework

Q-7: $A = \frac{2}{x} + \frac{1}{y}$, $B = \frac{4}{x} - \frac{9}{y}$, $c = x - y$, $D = px + qy$

(A) If $C = 2, x + y = 6$, what is the value of $4xy$? 2

(B) $A = 1$ and $B = -1$, find the value of (x, y) by using the method of substitution 4

(C) If $C = 2p$ and $D = p^2 + q^2$, find the value of (x, y) by using the method of elimination. 4

Solution

(A)The given equations are

$C = x - y$ and $C = 2$,So, $x - y = 2$ and $x + y = 6$

$\therefore 4xy = (x + y)^2 - (x - y)^2$

$= (6)^2 - (2)^2$

$= 36 - 4$

$= 32$

$\therefore$ Required value 32.

Previous Homework

(B)The given equations are , $A = \frac{2}{x} + \frac{1}{y}$, $B = \frac{4}{x} - \frac{9}{y}$

Here , $A = 1$ and $B = -1$,

$\frac{2}{x} + \frac{1}{y} = 1$ ... ... (i)

$\frac{4}{x} - \frac{9}{y} = -1$ ... ... (ii)

From (i),we get

$\frac{1}{y} = 1 - \frac{2}{x} \Rightarrow \frac{1}{y} = \frac{x-2}{x}$

$\Rightarrow y = \frac{x}{x-2}$ ... ... (iii)

Putting the value of y in (ii),we get

$\frac{4}{x} - \frac{9}{\frac{x}{x-2}} = -1 \Rightarrow \frac{4}{x} - \frac{9(x-2)}{x} = -1 \Rightarrow \frac{4-9x+18}{x} = -1$

$\Rightarrow 22 - 9x = -x \Rightarrow 22 = -x + 9x \Rightarrow 22 = 8x \Rightarrow 8x = 22$

$\therefore x = \frac{22}{8} = \frac{11}{4}$

Putting the value of x in (iii), we get

$y = \frac{\frac{11}{4}}{\frac{11}{4}-2} = \frac{\frac{11}{4}}{\frac{11-8}{4}} = \frac{11}{4} \times \frac{4}{3} = \frac{11}{3}$

$\therefore$ Required solution is : $(x, y) = \left(\frac{11}{4}, \frac{11}{3}\right)$.

x, y → variables

$\left(\frac{11}{4}, \frac{11}{3}\right)$ Ans

Previous Homework

(C) The given equations are , $C = x - y$ and $D = px + qy$

if $C = 2p$ and $D = p^2 + q^2$,

$x - y = 2p$ ... ... (iv)

And $px + qy = p^2 + q^2$ ... ... (v)

Multiplying (iv) by q and then adding with equation (v), we get

$qx - qy = 2pq$

$px + qy = p^2 + q^2$

$qx + px = 2pq + p^2 + q^2$

$\Rightarrow x(p + q) = (p + q)^2$

$\therefore x = \frac{(p+q)^2}{(p+q)} = p + q$

Putting the value of x in (iv) and we get,

$p + q - y = 2p$

$\Rightarrow -y = 2p - p - q$

$\therefore y = q - p$

Required solution is: $(x, y) = (p + q, q - p)$.

Previous Homework

POLL - 1

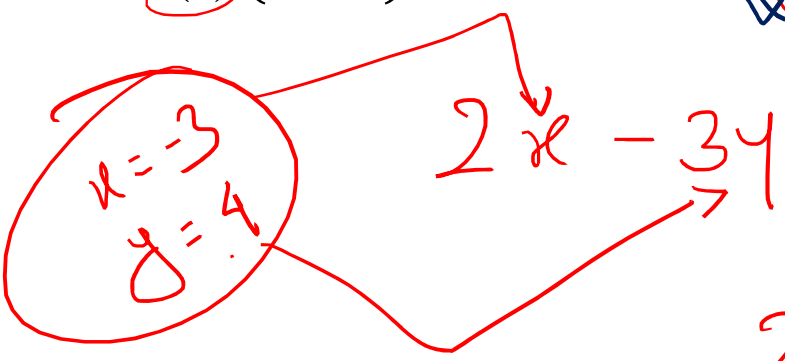
Which point satisfied this equation $2x - 3y = 18$? [D.B.-18]

(a) $(-3,4)$

(b) $(-4,3)$

(c) $(4,-3)$

(d) $(3,-4)$



$2(-3) - 3(4) = -6 - 12 = -18$

Previous Homework

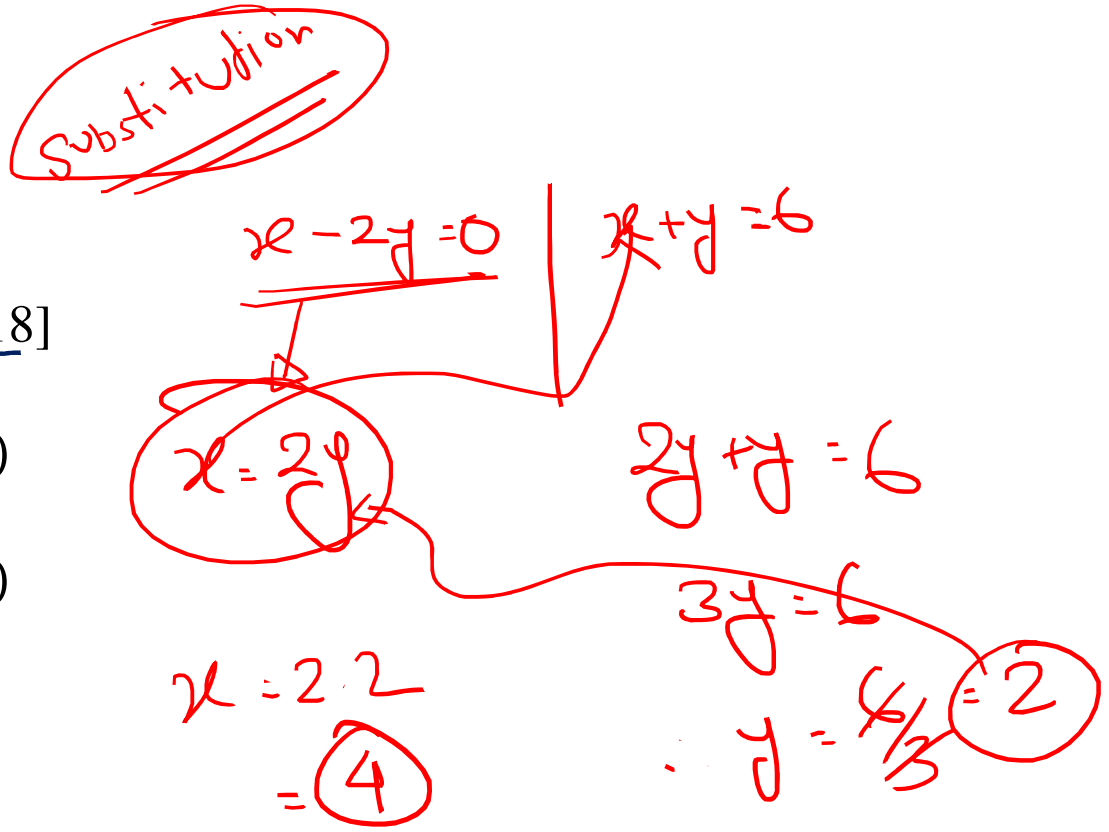
POLL - 2

Solve the following equations

$x - 2y = 0$ and $x + y = 6$? [Cu.B.-18]

(a) $(4, -2)$ (b) $(4,2)$

(c) $(-4,2)$ (d) $(5,1)$



Previous Homework

POLL -3

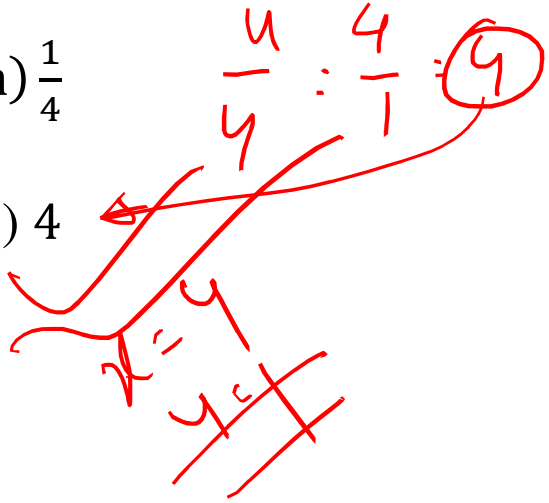
if $x + 2y = 6$ and $x - 3y = 1$, what *is the value of* $\frac{x}{y}$? [Ctg.B.-18]

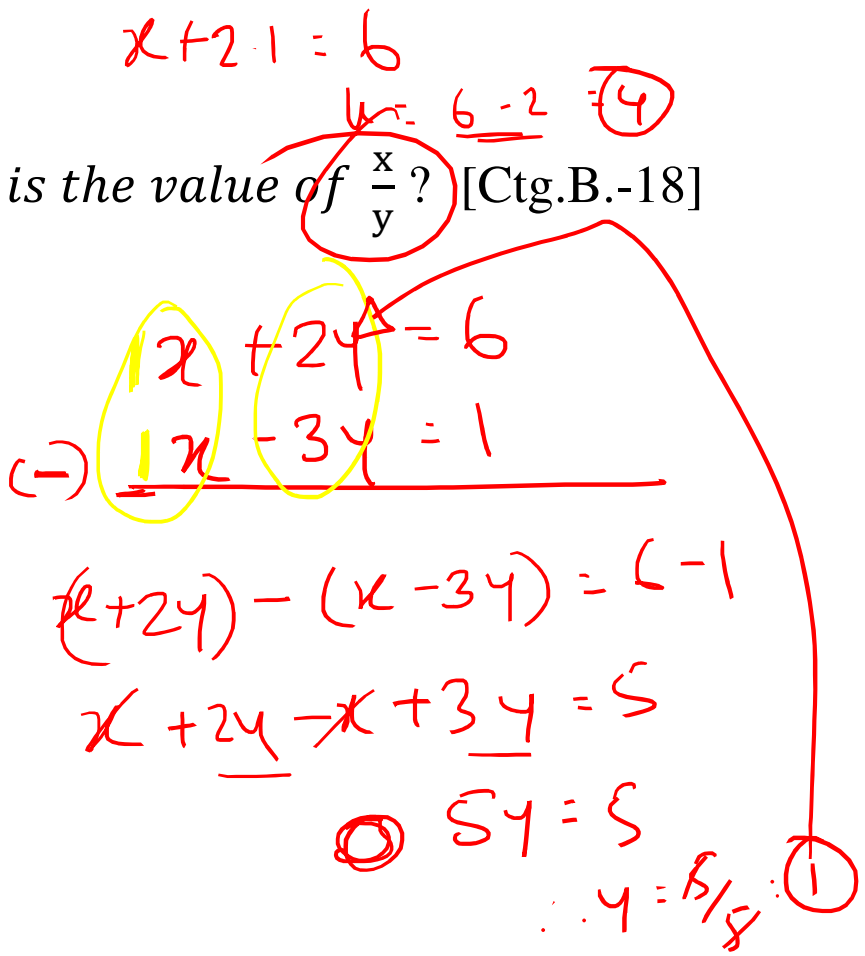
(a) $\frac{1}{4}$

(b) $\frac{1}{2}$

(c) 4

(d) 5





আসসালামু আলাইকুম

অধ্যায় - ৬.২

সরল সহসমীকরন

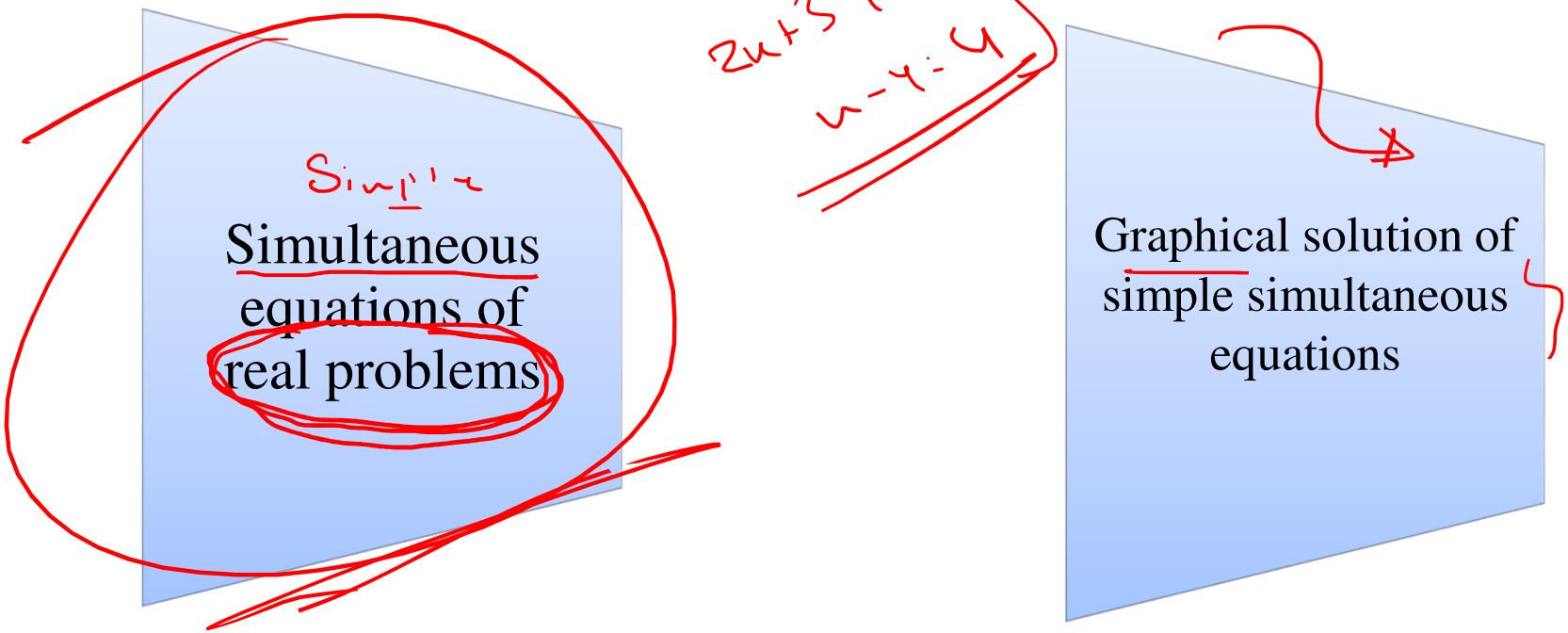
TAHSIN ANJUM

একাডেমিক এন্ড এডমিশন কেয়ার

উদ্ভাস

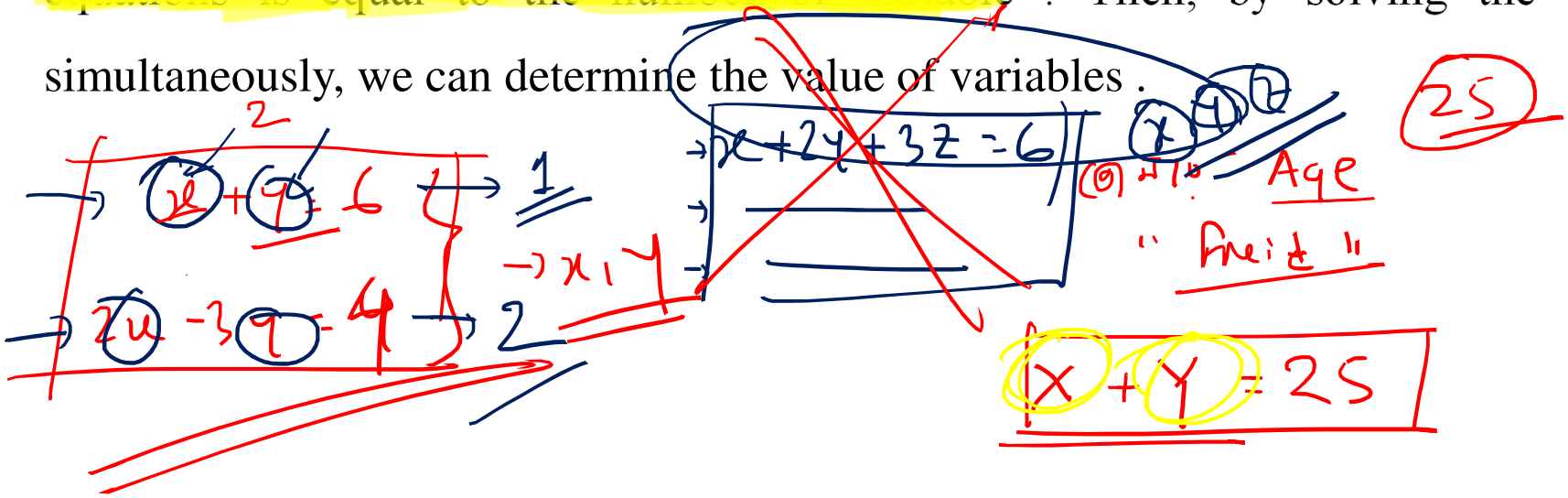
Since 2000

What will we learn from 6.2?



Simultaneous equations of real life problems

Formation and solution to simultaneous equations, we can solve many problems of real life . We use more than one variable in many problems . We form the equations using a separate symbol or each variable . In this case, the number of symbols used to form the equations is equal to the number of variable . Then, by solving the equations simultaneously, we can determine the value of variables .



Simultaneous equations of real life problems

If the sum and the difference of two numbers are 60 and 20 respectively , find both the numbers

Solution : Let the two numbers be x and y, Where x>y.

According to the 1st condition, $x + y = 60$.....(1)

According to the 2nd condition , $x - y = 20$.....(2)

Adding equations (1) and (2), we get

$$2x = 80$$

$$\text{or } x = \frac{80}{2} = 40$$

Again, subtracting equation (2) from equation (1) , we get

$$2y = 40$$

$$\therefore y = \frac{40}{2} = 20$$

Required two numbers are 40 and 20.

Simple Simultaneous equations

Example 4. If 7 is added with the sum of digits of a number of two digits, the summation will be thrice the digit of ten place. But, if we subtract 18 from the number, the digits change their position. Find the number.

Solution : Let x and y be the digits of ones and tens place of the two digit number respectively.

$\therefore$ The number is $x+10y$.

According to the 1st condition, $x+y+7=3y$

or, $x+y-3y=-7$

or, $x-2y=-7$.....(1)

According to the 2nd condition, $x+10y-18=y+10x$

or, $x+10y-y-10x=18$

or, $9y-9x=18$

or, $9(y-x)=18$

or, $y-x=\frac{18}{9}=2$

$\therefore y-x=2$.....(2)

Adding (1) and (2), we get, $-y=-5$

$\therefore y=5$

Putting the value of y in equation (1), we get

$x-2\times5=-7$

$\therefore x=3$

Required number is $3+10\times5=3+50=53$

Number → $x+10y$

Digit → x , y

$x+y+7=3y$ ← 1st eqn

Subs / Elimination

Sum of the Digits

$(x+10y)-18=y+10x$ ← 2nd eqn

Number

73

37

Simple Simultaneous equations

POLL - 4

If sum and difference of two number are 14 and 2 respectively ,find both the numbers ?

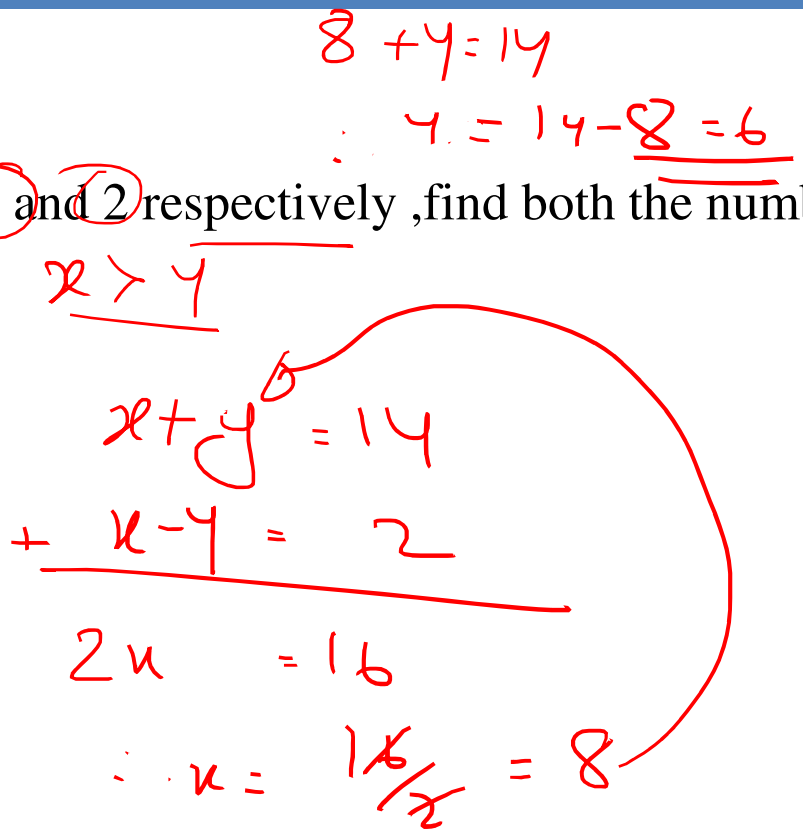
[Ctg.B.-18]

(a) (7,7)

(b) (8,6)

(c) (16,2)

(d) (9,5)



Simultaneous equations of real life problems

POLL – 5

The perimeter of a parallelogram is 30cm and if the ratio of adjacent sides is 3:2, what is the length of the smallest side ? [Dnj.B.-18]

(a) 12 (b) 9

(c) 6 (d) 3

$2(a+b) = 30$

$\frac{a}{b} = \frac{3}{2}$

$a = \frac{3}{2}b$

$2(a+b) = 30$

$2\left(\frac{3}{2}b + b\right) = 30$

$2 \times \frac{3}{2}b + 2b = 30$

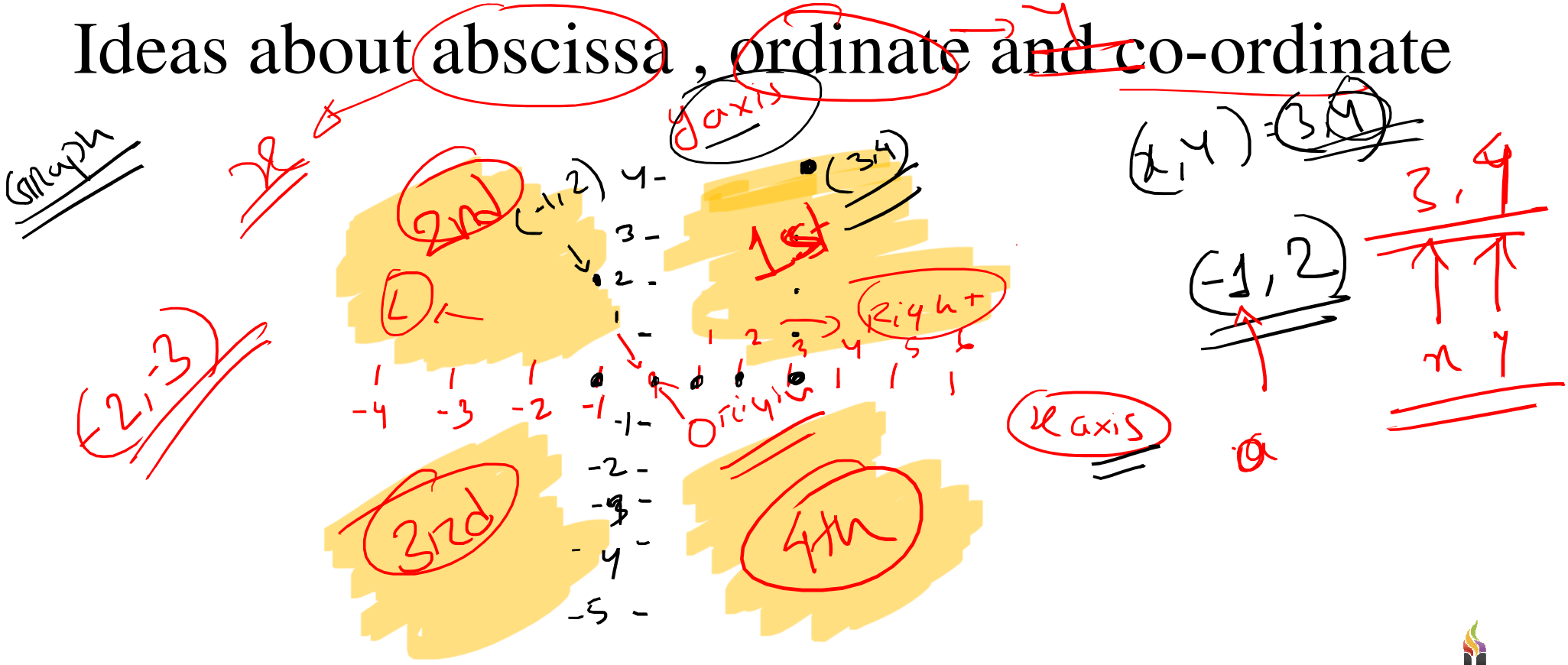
$3b + 2b = 30$

$5b = 30$

$\therefore b = \frac{30}{5} = 6$

Graphical solution of simple simultaneous equation

Ideas about abscissa , ordinate and co-ordinate



Graphical solution of simple simultaneous equation

POLL – 6

Which point lies on X axis ? [D.B.-17]

(a) (3,3)

(b) (−3,5)

(c) (0,4)

(d) (4,0)

Graphical solution of simple simultaneous equation

There are two equations in simple simultaneous equations with two variables. By drawing the graphs of two simple equations, we get two straight lines. The point of intersection of these lines lies on both the straight lines. The co-ordinates (x, y) of this point of intersection will be the solution of the given simple simultaneous equations. The two equations are satisfied simultaneously by the obtained values of x and y. Therefore, only solution to a pair of simple simultaneous equations is the abscissa and the ordinate of the point of intersection.

Remark : If the graphs of given simultaneous equations are parallel there is no solution.

Graphical solution of simple simultaneous equation

Example 7. Solve with the help of graphs :

$3x + 4y = 10$.....(i)

$x - y = 1$.....(ii)

From equation (i) we get,

$4y = 10 - 3x$

$y = \frac{10 - 3x}{4}$

$x - y = 1$

$x - y = y$

$y = \frac{10 - 3(-2)}{4} = \frac{10+6}{4} = \frac{16}{4} = 4$

We construct the table below from the values of y for different values of x:

x	-2	0	2	4	6
y	4	$\frac{5}{2}$	1	$\frac{-1}{2}$	-2

Table - 1

$(-2, 4), (0, \frac{5}{2}), (2, 1), (4, -\frac{1}{2}), (6, -2)$

From equation (ii) we get

$y = x - 1$

We again construct the table below from the values of y for the different values of x.

x	-2	0	2	4	6
y	-3	-1	1	3	5

Table - 2

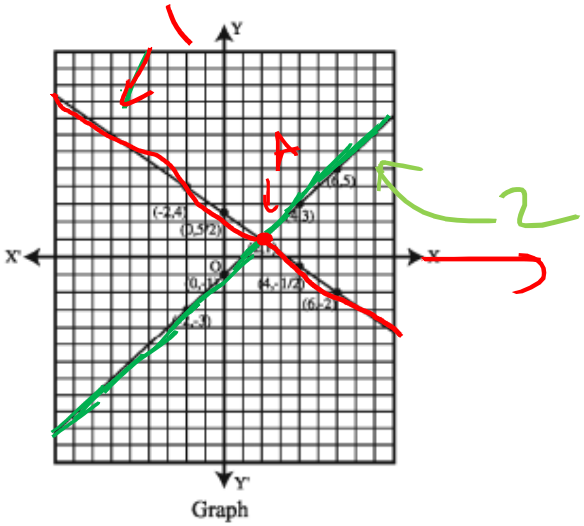
$(-2, -3), (0, -1), (2, 1), (4, 3), (6, 5)$

Graphical solution of simple simultaneous equation

Let XOX' and YOY' be x-axis and y-axis respectively with O as the origin. Let the length of a side of the smallest square of both axes be chosen as a unit. We put the points of table-1 $(-2, 4)$, $(0, \frac{5}{2})$, $(2, 1)$, $(4, -\frac{1}{2})$ and $(6, -2)$ on the graph paper. Adding the points and extending the line in both directions, we get the graph of the equation (i).

Again, we put the points of table-2 $(0, -1)$, $(2, 1)$, $(4, 3)$ and $(6, 5)$ on the graph paper. Joining the points, we get the graph of the straight line which represents the equation (ii).

This straight line intersects the previous one at the point A. A is the common point of both the straight lines. Both the equations are satisfied by coordinates of A. From the graph, we see that the abscissa of A is 2 and the ordinate of A is 1. Therefore, the required solution is $(x, y) = (2, 1)$.



Graph

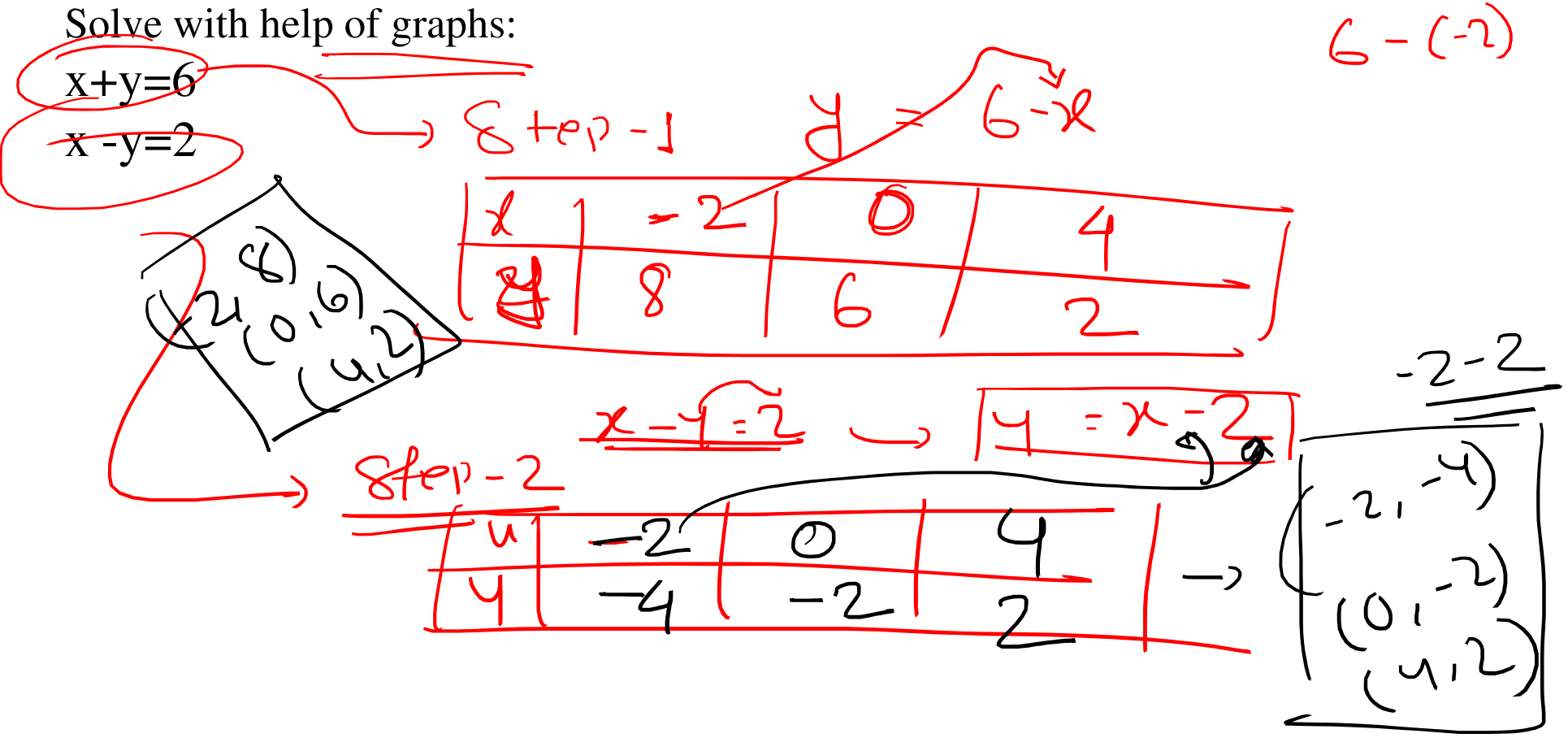
intersection Point

Graphical solution of simple simultaneous equation

Solve with help of graphs:

x+y=6

x -y=2



Graphical solution of simple simultaneous equation

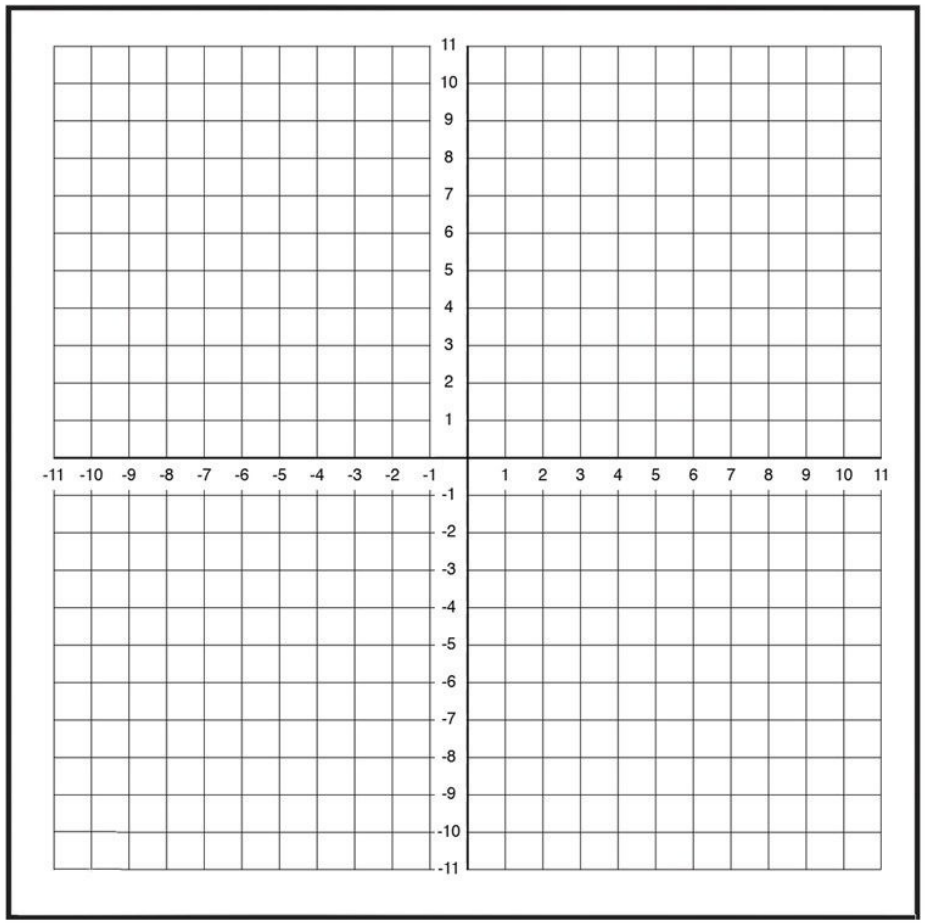


table - 1

" -2

Graphical solution of simple simultaneous equation

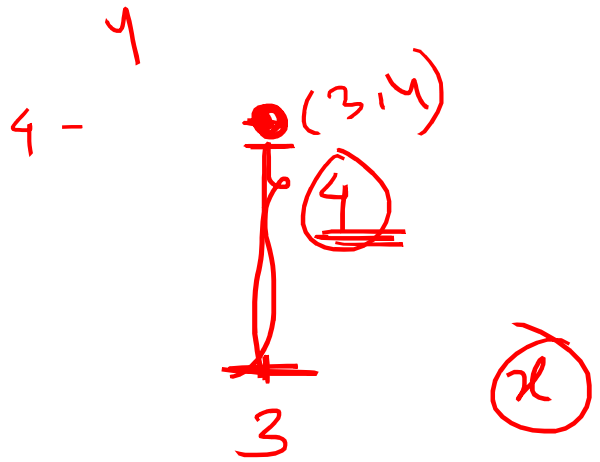
Simple simultaneous equation

POLL – 7

What is the distance of point A(3,4) from X axis? [Dnj.B.-17]

(a)3 (b) 4

(c) 5 (d) 7



Creative Question

Here $9x - 7y = 13$ and $5x - 3y = 9$ two simple simultaneous equations .

(A) Which equation is satisfied by this point $(0, -3)$? 2

(B) Solve these equations by using the method of elimination . 4

(C) Solve the equation with the help of graph and find out the abscissa and the ordinate of the intersect point . 4

লেগে থাকো সৎভাবে,
স্বপ্ন জয় তোমারই হবে

উদ্ভাস-উন্মেষ শিক্ষা পরিবার