okay friends in continuation with earlier lecture one now graphical solution of system of linear in equation in two variables

so we have more than one linear equation in two variable and we have to solve that two or three in equation simultaneously

so for this solving simultaneous linear in equation means finding the set of points x y for which all the constants are satisfied here constants means linear equation in two variable in this simultaneous solution will be known as constants

so solution set may be an empty set for example for this in equation set of constants the solution will be empty set a bounded reason and an unbounded reason

so we will just discuss this example how to solve these in equations or these constants simultaneously

so to solve system of linear equation in two variable graphically first of all draw the graph of all the given linear inequalities we have already discussed how to draw the graph of linear inequalities in one variable or two variable then mark the feasible reason of each lines means we have to mark solution reason again we discuss how to find solution reason find the common reason which satisfy all the given linear inequalities then we have to find what will be the common reason whether the given inequalities have common reason may be common reason may not have common reason and this common reason is required solution of given system of linear inequalities if the given system of linear inequalities have common reason then that reason may be bonded reason may be unbounded reason let us take another example solve system of linear inequalities graphically three x plus two i greater than equal to twenty four three x plus y less than equal to fifteen x greater than equal to four solution

so let this is first inequalities this is second and this is third inequalities

so associated equation for one two and three are three x plus two i equal to twenty four three x plus y equal to fifteen and x equal to four

so these three are associated equation four given in equation

so four one three x plus two y equal to twenty four put y equal to zero implies x equal to eight x equal to zero implies y equal to twelve

so points are 8 0 and 0 12 for second three x plus y equal to fifteen put y equal to zero implies x equal to five x equal to zero implies y equal to fifteen and four third x equal to four is a line parallel to y axis passing through four zero now draw the graph of these three lines x y zero since we have to locate point eight zero zero twelve and five zero and zero fifteen

so for sake of convenience we take one division equal to 2 4 6 8 10 12 14 16.

2 4 6 8 10 12 14 and this is 16 this is y 16.

so 8 0 means this point will be 8 0 and 0 12 and this point will be 0 12.

join these two point

so this line will represent three x plus two y equal to twenty four then point five zero this point is eight zero and this point is zero twelve now five zero

so this point will be five and zero fifteen this point will be fifty to fifteen

so join this two points

so equation of line three x plus y equal to fifteen now x equal to four

so x equal to four is a line passing through this four zero and parallel to y axis see x equal to four now let us consider or given inequalities three x plus two i greater than equal to twenty four now four one that is three x plus two y greater than equal to 24

so origin test means we have to check whether origin lies in the region or not

so put x equal to 0 and y equal to 0.

so 3 into 0 plus 2 into 0 equal to 0 is greater than equal to 24 which is not true
so origin does not belongs to solution reason it means for this three x plus two i greater than equal to twenty four the reason will be this because in this region origin does not lie
so this will be the reason this will be the reason now four second that is three x plus y less than equal to fifteen
so put x equal to zero and y equal to zero
so 3 into 0 plus 0 equal to 0 less than equal to 15 this is true
so origin belongs to solution reason it means for this three x plus y equal to fifteen the solution will be reason will be this solution region will lie in this direction now for three four third that is x greater than equal to four it means x greater than equal to four means all the value of x which is greater than equal to four now for different inequalities we have different solution reason now we have to find which reason will be the common reason or whether common reason will exist or not
so in this case we have
so according to defined reason for different given inequalities no reason will be common reason
so solution reason will be phi means if you said for this and set with different color
so we see that no reason which contains all the three colors means blue green and red
so for this system of given in equities we have no feasible reason or no solution region
so solution region will be empty set now let us consider another example solve graphically two x plus three y less than equal to twelve x greater than equal to two y greater than equal to one solution say this is first this is second and this is third
so associated equation two x plus three y equal to twelve x equal to 2 y equal to 1 associated equation 4 1 2 and 3.
now four one two x plus three y equal to twelve
so put y equal to zero implies x equal to six x equal to zero implies y equal to four
so points are six zero and zero four it means this line intersect x axis at six zero and y axis at zero four four second x equal to two is a line parallel to y axis and passing through two zero for three y equal to one is a line parallel to x axis and passing through zero one now draw the graph of all these three lines x axis y axis 0 1 2 3 4 5 6.
one two three four
so for first line we have point six zero and zero four six zero and zero four
so join these two point
so this will be line two x plus three y equal to 12.
now x equal to 2 is a line parallel to y axis and passing through 2.
x equal to two and c l x equal to two and this is a line it says y equal to one now we have to define its solution region for different inequalities
so for this we just check origin test origin test
so 4 1 that is 2x plus 3y less than equal to 12 put x equal to 0 and y equal to 0.

so 2 into 0 plus 3 into 0 equal to 0 less than equal to 12 is true
so 0 zero lies in the solution reason reason for two x plus three y less than equal to twelve for second x greater than equal to two
so solicitor reason lies in right hand side of line x equal to two and four

three that is y greater than equal to one implies solution reason lies in upper part of line of the line y equal to one now define reason accordingly in the graph

so for two x plus c y greater than equal to twelve origin lies it means this will be the solution reason for in equation two x plus c y less than equal to twelve now for x greater than equal to two the right hand side of the line x equal to two

so this will be the solution reason for x equal to two now for y greater than equal to one this will be the solution reason now combining these three region will get this reason this region and this solution region and this solution region

so this this triangle this triangle a b c will satisfy all the three inequality

so this shadow reason will be the solution reason for the given system of given system of in equation two x plus three y less than equal to twelve x greater than equal to two and y greater than equal to one

so we can finally write shader region reason a b c will satisfy all the three given constants

so solution reason will be the shadow region a b c

so in this way we can find the solution region for the given different inequalities now consider another example that is solve graphically x plus 2y less than equal to eight two x plus y less than equal to eight x greater than equal to zero y greater than equal to zero solution associated equation for say this is one this is two and this is three for first second first and second

so x plus two i equal to eight and two x plus y equal to eight four one x plus two y equal to eight put y equal to zero implies x equal to 8 x equal to 0 implies y equal to four

so points are eight zero and zero four for second two x plus y equal to eight put y equal to zero implies x equal to four and x equal to zero implies y equal to eight

so points are four zero and zero eight x equal to x greater than equal to 0 and y greater than equal to 0 implies first quadrant means in first quadrant both x and y are positive

so x greater than zero and y greater than equal to zero is a condition for first quadrant now draw the graph of these two associated equations x 2 4 6 8 10 2 4 6 8

so points are eight zero

so this point is eight zero and zero four and this point is zero four

so join these two points this will represent x plus 2 y equal to 8 this is 8 0 and this is 0 4.

now four zero and zero eight

so this is four zero and this is zero eight again join these two points and this will represent line two x plus y equal to eight and this point is 0 8 and this point is 4 0 to define the reason we have to again check origin test

so origin test four one x plus two y less than equal to eight put x equal to 0 y equal to 0 imply 0 plus 2 into 0 means 0 is less than equal to 8 is true

so origin

so 0 0 belongs to solution region for two two x plus y less than equal to eight put x equal to zero y equal to 0 implies 2 into 0 plus 0 equal to 0 is less than equal to 8 is again true origin belongs to solution region

so origin lies in solution region of both the in equation x plus two y less than equal to eight and two x plus y less than equal to eight now define the solution reason in the figure this is x greater than equal to zero and this is y greater than equal to zero origin lies in the region

so origin lies in the region origin also rise lies for solution region of this

in equation now combining this condition it means here
so solution region is here this is a it means this part will be the solution reason for the given indication or you can say common reason for the given system of inequation and name it as this is a this is b and this is c
so solution reason common solution region for the given given system of inequalities one two and three will be shaded region o a b c let us take another example solve graphically x plus y less than five four x plus y greater than equal to four x plus five y greater than equal to five x less than equal to four y less than equal to three
so here we have five linear inequities and we have to solve these five inequalities simultaneously
so say this is one this is 2 this is 3 and this is 4 and this is 5.
associated equation equation for given in equation 1 2 3 4 and 5 are x plus y equal to five four x plus y equal to four x plus five y equal to five x equal to four y equal to three the four one x plus y equal to five put y equal to 0 implies x equal to 5 x equal to 0 implies y equal to 5
so points are five zero and zero five four two four x plus y equal to four put y equal to 0 implies x equal to 1 x equal to 0 implies y equal to 4 4 third x plus 5 y equal to five
so put y equal to zero implies x equal to 5 and x equal to 0 implies y equal to 1
so points are one zero and zero four points are five zero and zero one four fourth x equal to four is a line parallel to y axis and passing through four zero y equal to three is a line parallel to x axis and passing through zero three now after discussing all the five associated equation we are able to draw the graph of this equations x axis y x is 0 1 2 3 4 five six one two three four five six minus one minus two minus one minus two
so four x plus y equal to five points are five zero and zero five five zero and zero five
so join these two point x plus y equal to five five zero and this is zero five for four x plus y equal to four points are one zero and zero four one zero and zero four
so join these two points this is one zero and this is zero four for third equation x plus five y equal to five points are five zero and zero one five zero and zero one
so join these two points x plus five y equal to five and this line is four x plus y equal to four
so this is point zero one is five zero now x equal to four is a line
so x equal to 4 is a line parallel to y axis and passing through 4 0.

so this is x equal to 4 and y equal to three is a line parallel to x axis and passing through zero three
so this is y equal to three now let us check the inequality
so first inequity is x plus y less than equal to 5 it means this line sim says x plus y less than equal to five
so this line is half line
so this line is not full line this line is half line and x plus y less than five
so when you check origin test you will find this region will be the solution region this region will be the solution reason again for second inequality if you again go through origin test you will find this reason will be the solution reason and for third iniquities if you go through the origin test you will find this region will be the solution region and four fourth x less than equal to four for x less than equal to four this will be the solution region and for y

less than equal to three downward reason will be the solution reason when you combining all this reason

so this is solution region this is solution region and this is solution reason and this is solution reason and this will be the solution region

so four five in utility we have these five common solution region which satisfy by this shaded region

so say this is a this is b this is c this is d and this is e

so this region having this boundary line is not included this boundary line is not included from this to this point this is open

so this is open reason not closed reason

so finally we can say common common reason for all the given in utilities 1 2 3 4 and 5 will be the shaded region a b c d e hence solution region will be region a b c d e

so in this way we can solve many in equation simultaneously and find common reason or solution reason for the given inequalities simultaneously okay thank you you