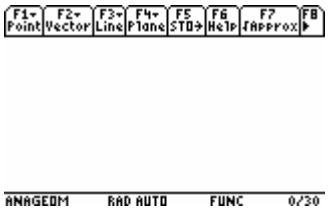
Anageom tutorial

by Tomas Boril (borilt@gmail.com)

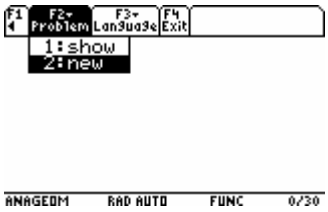
Start Anageom

Press “diamond” and “3”.



New problem

Press F8 and choose Problem, new.

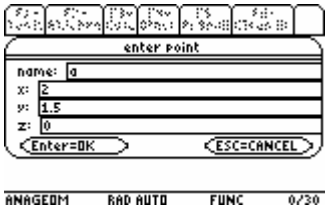


Now all old variables are deleted and we can start our new problem.

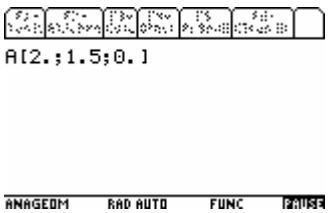
We want to enter these points:

A [2; 1.5; 0]
B [4; 0.5; 0]
C [0; -5; 3]
D [2; -1; 1]

Press F1 and Enter. Then enter point A.

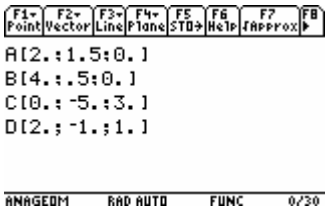


Press Enter.



Now we are in pause mode. If the result is big, we can scroll the screen by left and right arrow. Press enter to leave the pause mode.

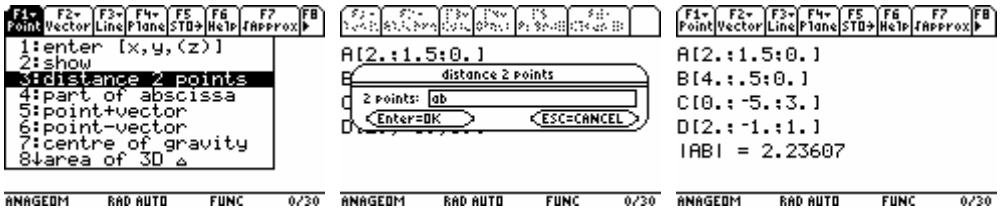
Ok. Now enter points B, C and D.



If you have entered some point wrong, enter it again, it will overwrite.

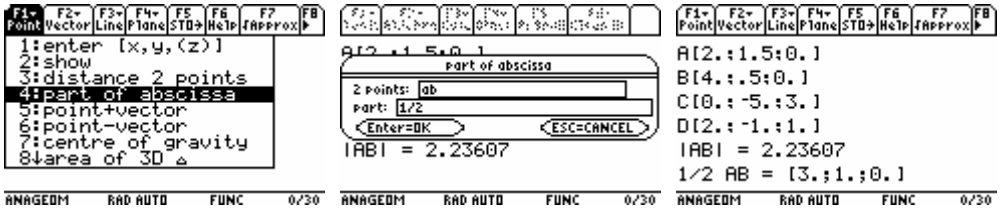
What is distance between A and B?

Press F1, 3, ab, ENTER twice and once more ENTER to leave the pause mode.

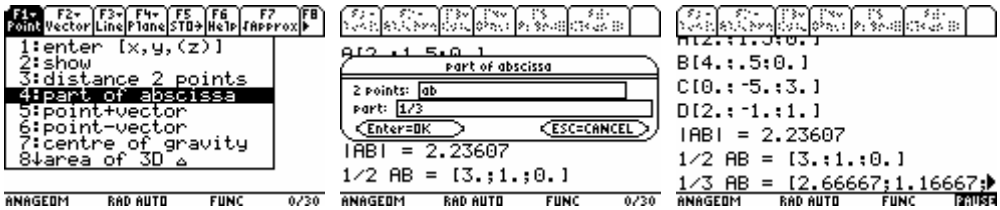


The distance is 2.23. I will be more brief in next questions so just follow screenshots.

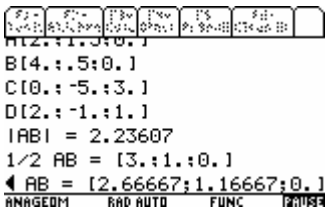
What is point just in half between A and B?



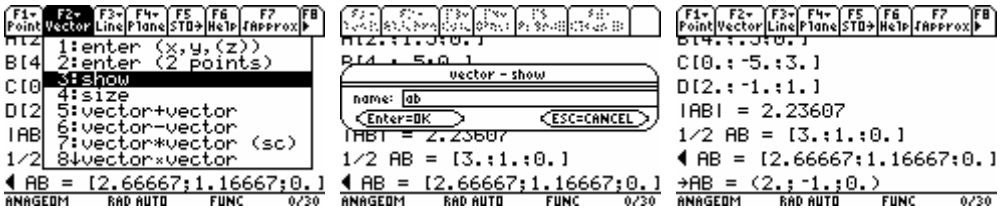
What is point in one third between A and B?



We can scroll and then press ENTER.

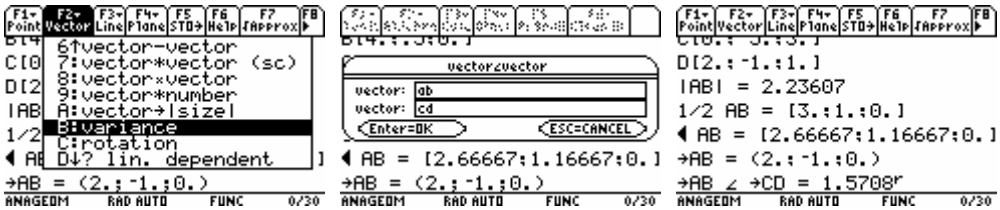


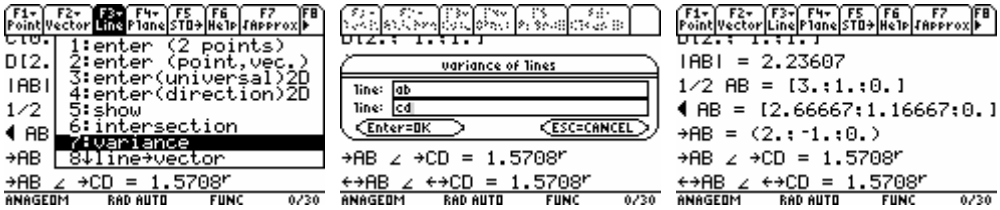
What is vector between A and B?



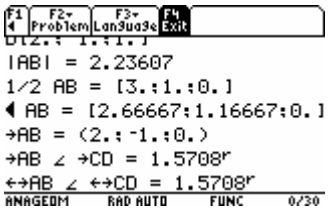
What is angle between AB and CD?

We can do this in two ways – by vectors or by lines.

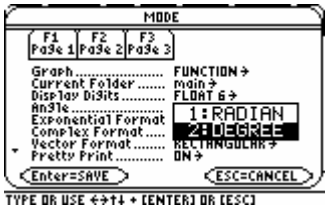




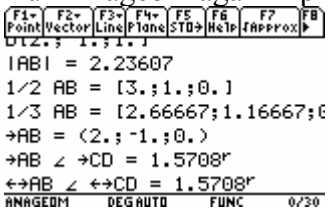
If we do not like result in radians, we can exit Anageom and set degree mode and run Anageom again – it remembers all variables. To access Exit menu, press F8.



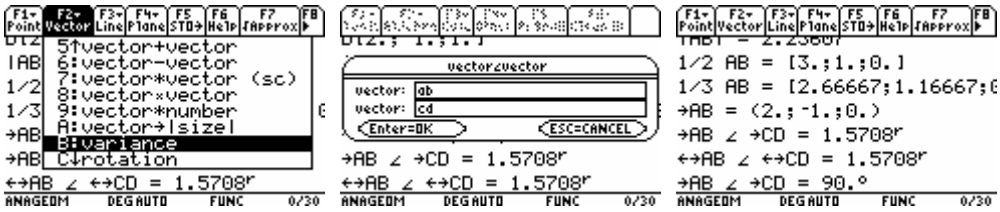
Press MODE and set degrees mode.



Run Anageom again – press “diamond” and “3”.

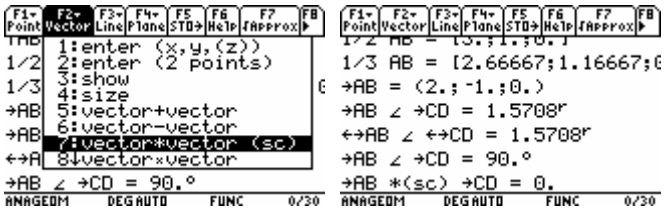


Now we calculate angle again, exactly same way as before.



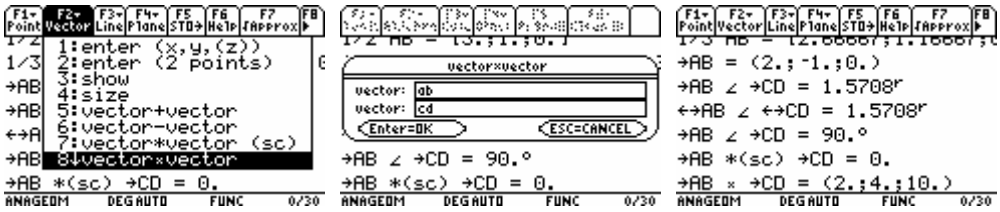
Nice. It seems that both lines are perpendicular.

Calculate scalar product of AB and CD.

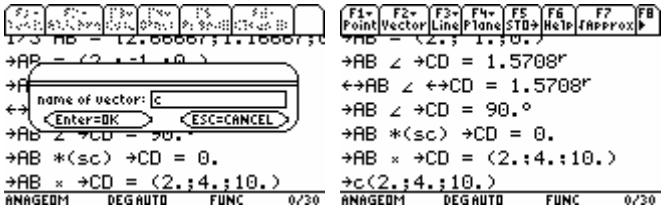


It is 0. So they are perpendicular.

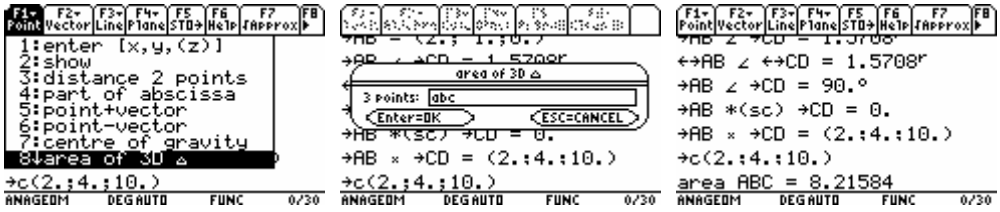
Calculate vector product between AB and CD and store it as vector c.



Press F5.



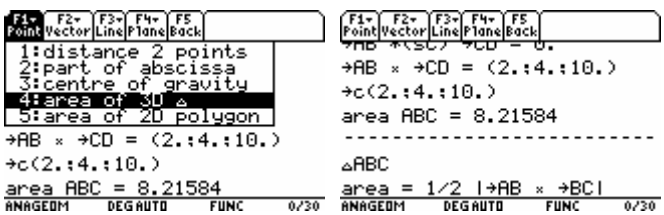
What is area of triangle ABC?



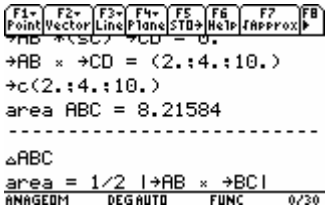
And what formula have you used to calculate it?!?

Do not panic, we have got help ☺

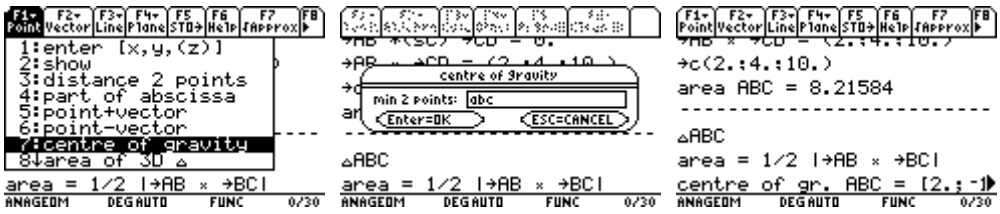
Press F6.



And press F5.

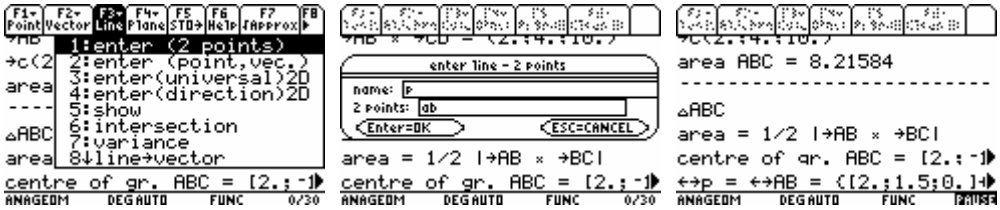


What is a centre of gravity of triangle ABC?

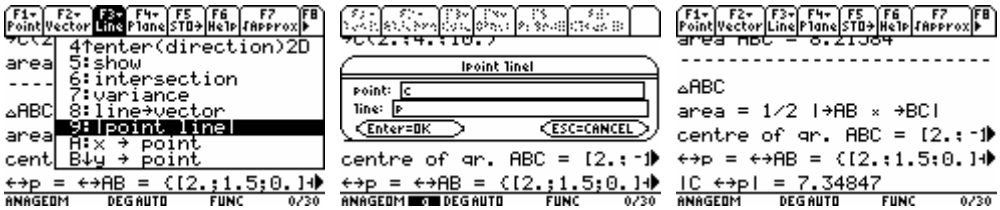


We could scroll the result or save the result if we wanted.

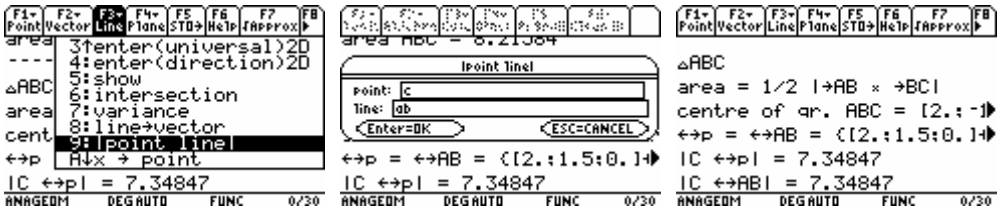
Make line p from points A and B



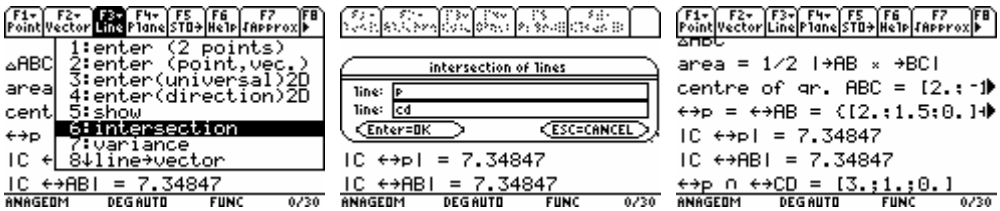
What is distance between line p and point C?



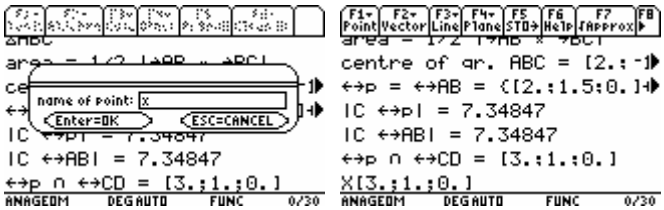
You can also try to calculate distance between line AB and point C, it is the same.



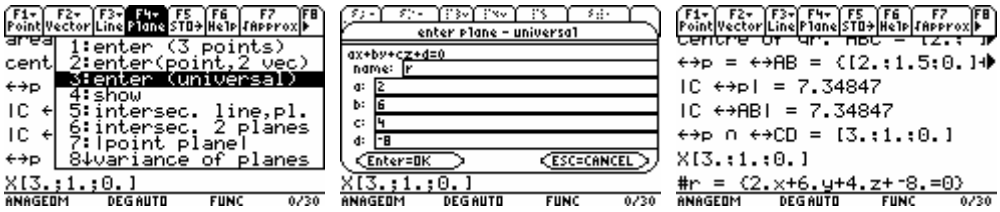
Calculate intersection of line p and line CD and store this point as X.



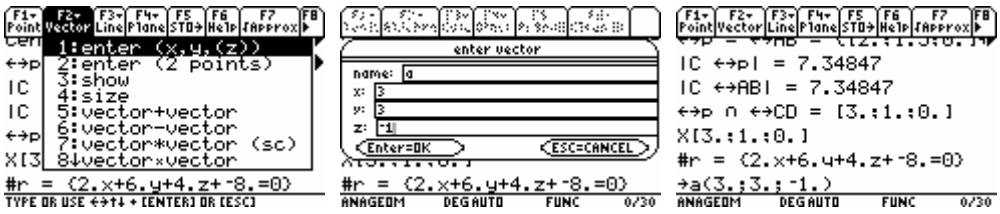
Press F5.



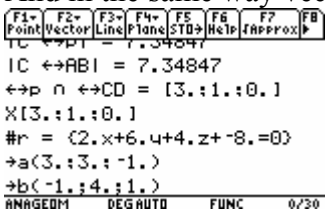
Enter plane r: 2x + 6y + 4z – 8 =0



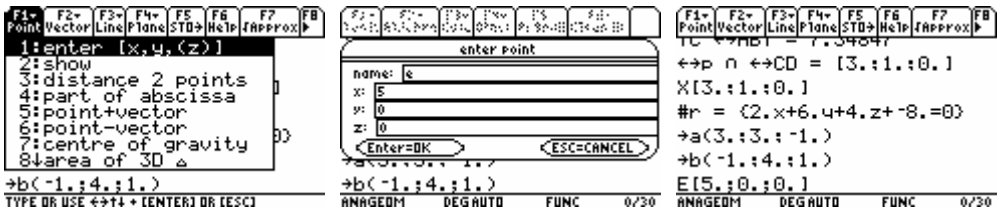
Enter vectors a (3; 3; -1) and b (-1; 4; 1)



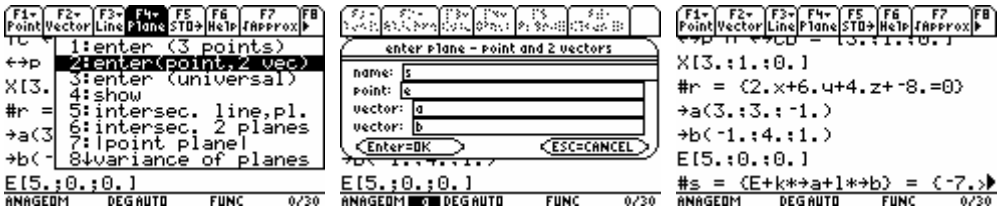
And in the same way vector b…



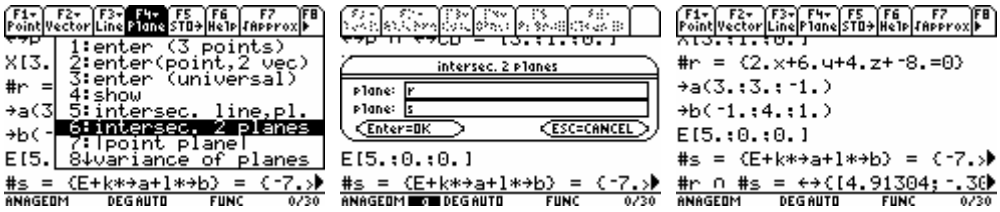
Enter point E (5; 0; 0)



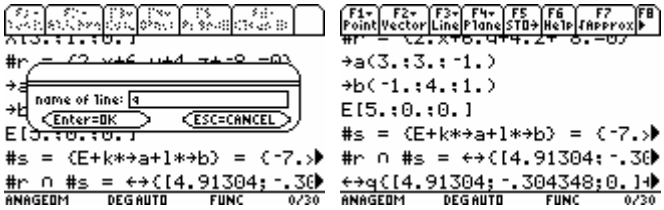
Enter plane s: it includes point E and vectors a and b.



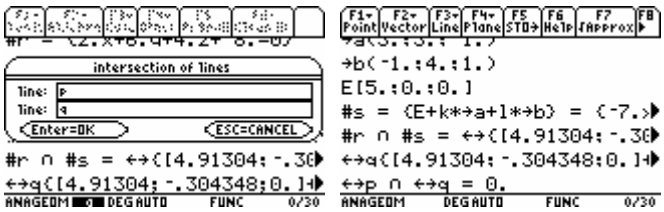
Calculate intersection of planes r and s and store it as line q.



Press F5.

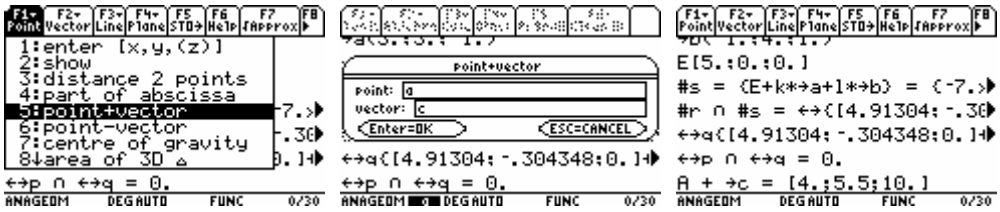


Calculate intersection of lines p and q.

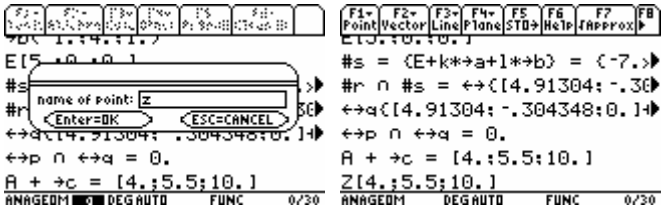


You can see that the intersection does not exist.

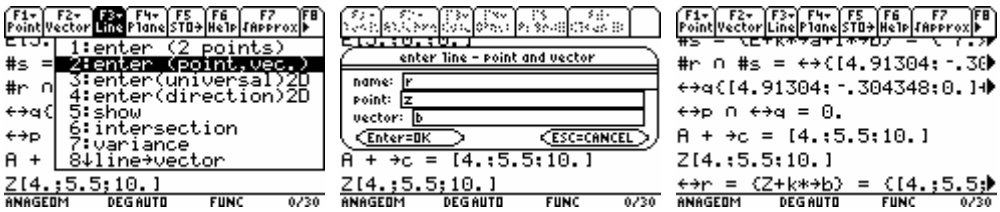
Calculate point Z which is point A moved in direction of vector c.



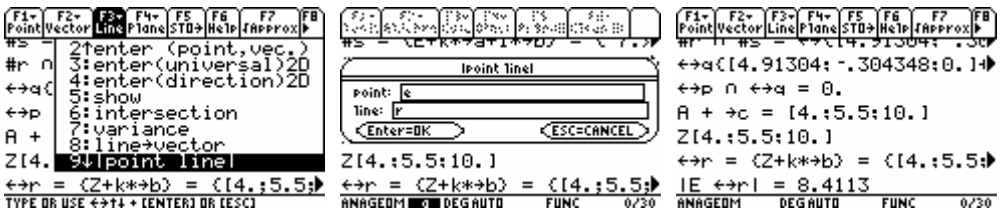
Press F5.



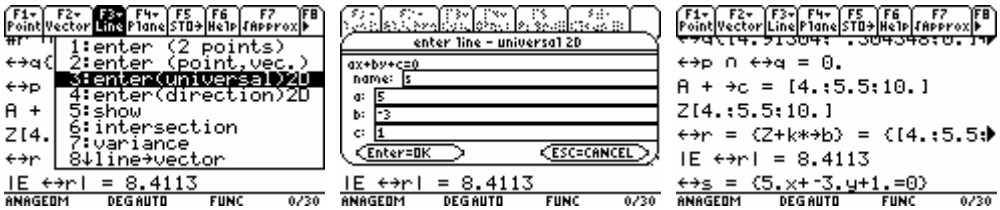
Enter line r, which has direction of vector b and and goes through point Z.



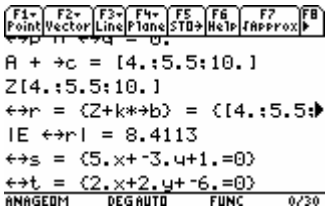
What is distance between line r and point E?



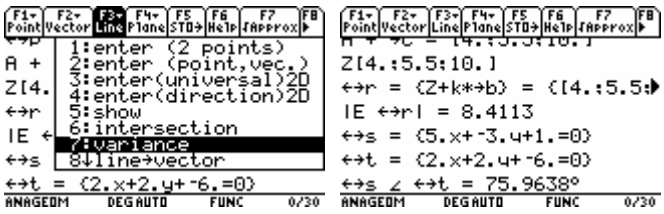
Enter 2D lines, s: 5x – 3y + 1 = 0 and t: 2x + 2y – 6 = 0



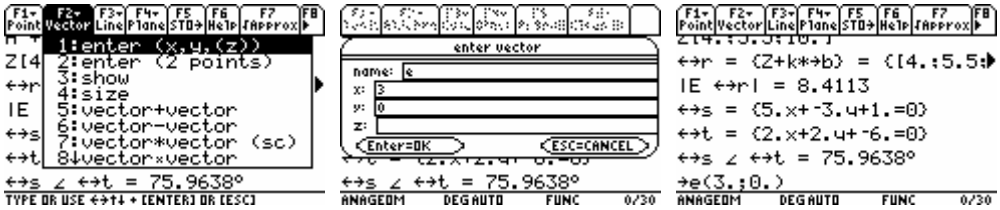
And in the same way line t.



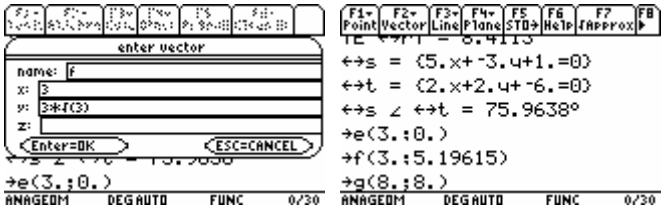
What is angle between lines s and t?



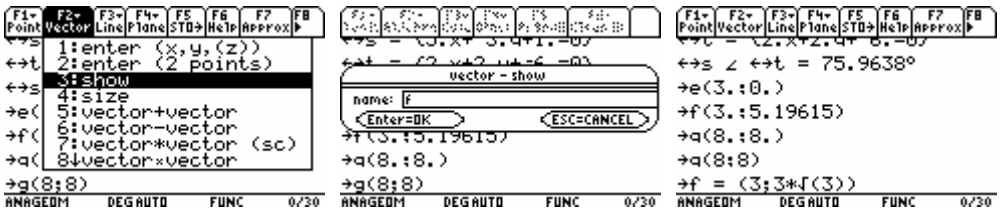
Enter 2D vectors, e (3; 0), f (3; 3*√3) and g (8; 8)



And in the same way vectors f and g.

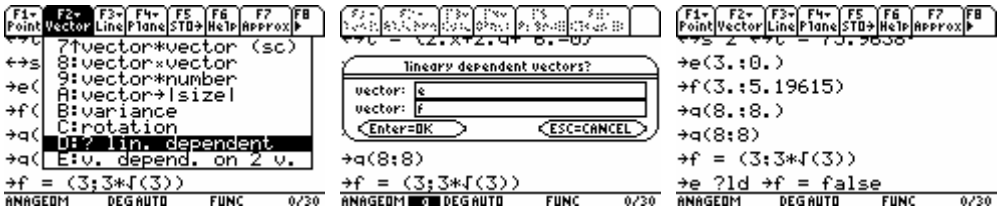


But the vector f is 5.19615. We wanted 3*√3. What is wrong? Nothing, just turn off approx mode by pressing F7.



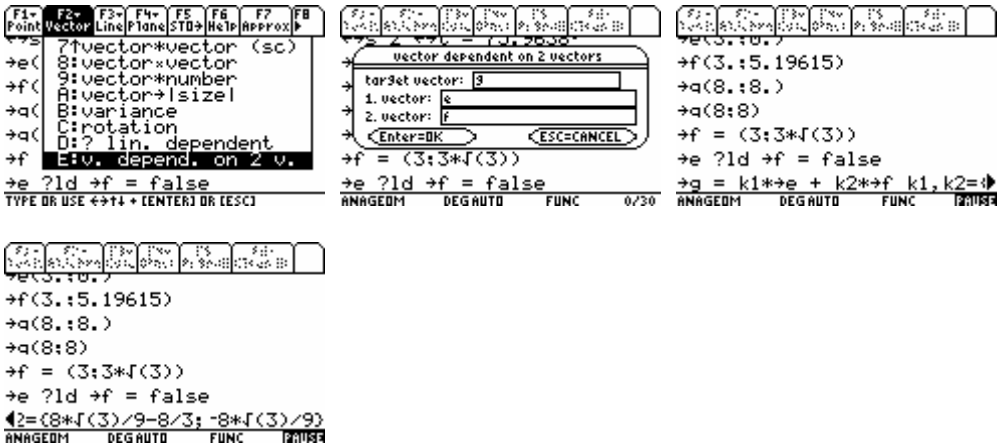
Ok. It is all right. It was stored correctly. It was only because of approx display mode.

Are vectors e and f linear independent?

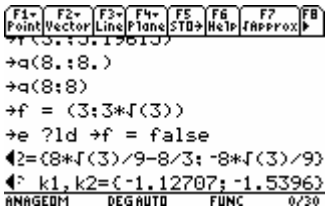


No, thery are not. So they can be understanded as coordinates.

How you can express vector g by sum of vectors e and f?

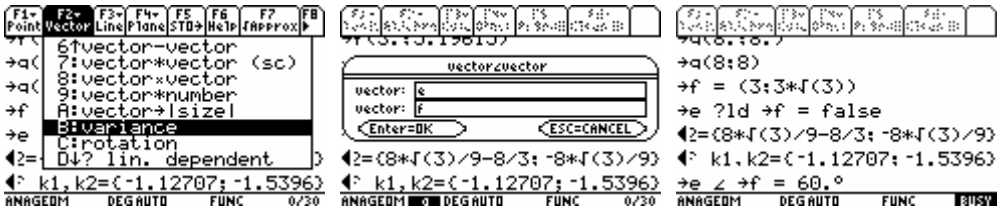


These numbers are coordinates of vector g in the base of vectors e and f. We can turn on approx display mode by pressing F7.

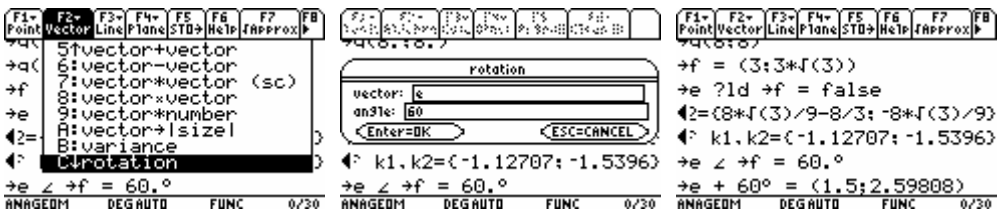


Rotate vector e so vectors e and f will be lineary dependent.

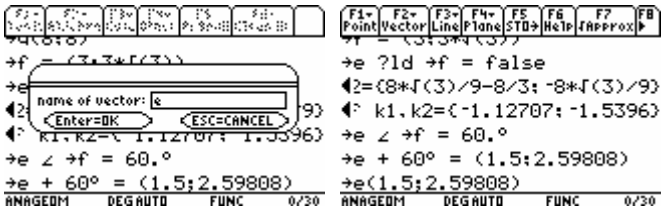
Ok. But we do not know the angle at this time.



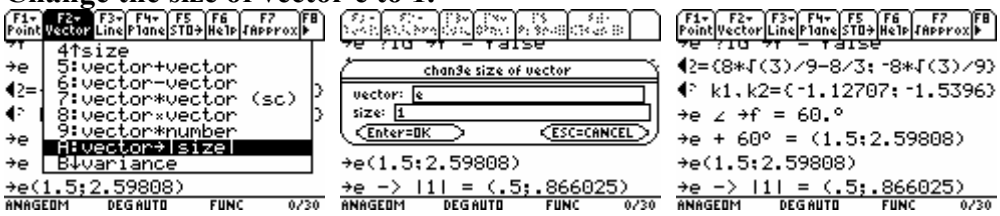
Ok, it is 60 degrees.



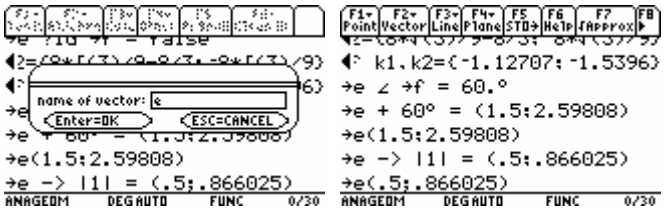
Press F5.



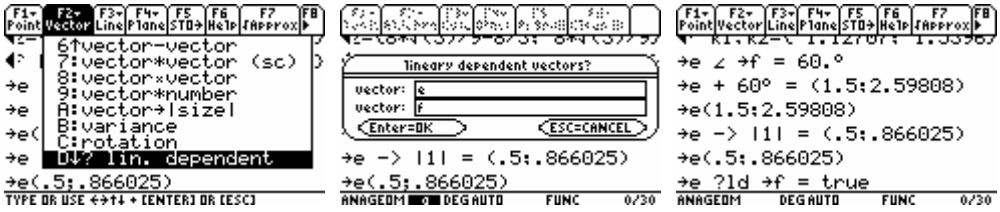
Change the size of vector e to 1.



Press F5.



Are vectors e and f linear independent?



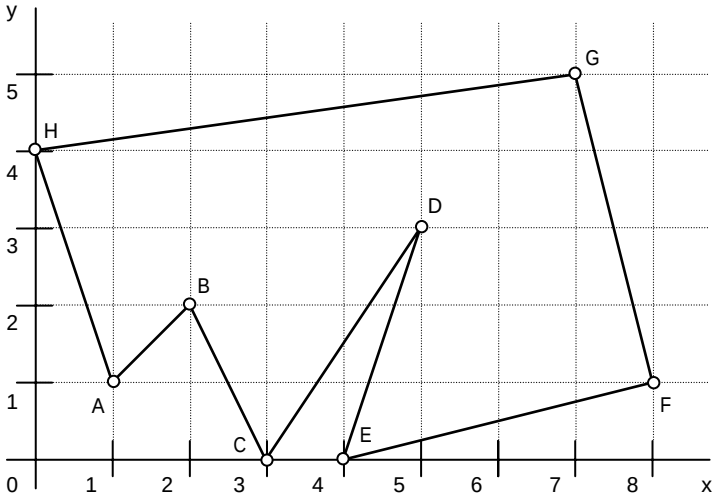
Yes, they are. So they cannot be understanded as coordinates any more.

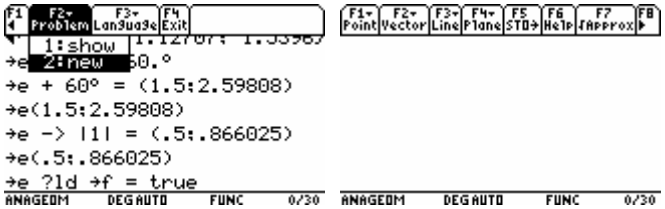
How you can express vector g by sum of vectors e and f?

It is tricky question because e and f are not coordinates. Let's see:

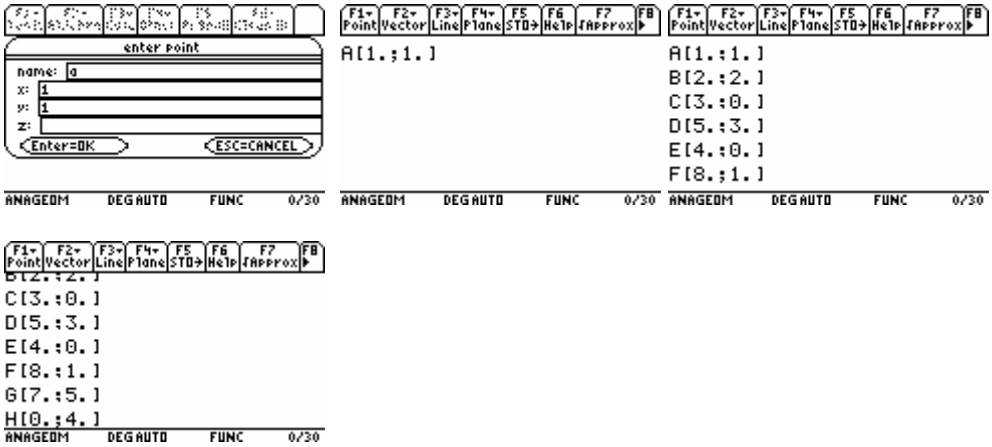
Exactly as I have said. Press ENTER and ESC.

Start new problem and calculate the area and the centre of gravity of this polygon.





Enter all points A through H.



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