1. Given 4 points in the xy plane:

$$\begin{pmatrix} 1.0 \\ 2.7684 \end{pmatrix}, \begin{pmatrix} 2.0 \\ 2.5461 \end{pmatrix}, \begin{pmatrix} 3.0 \\ 2.076 \end{pmatrix}, \begin{pmatrix} -3.3 \\ 1.3682 \end{pmatrix}$$ which lie on the ellipse:

$$\boxed{\frac{(x-x_0)^2}{a^2} + \frac{(y-y_0)^2}{b^2} = 1}$$, find the ellipse parameters $x_0, y_0,$

a, and b by __newton iteration__. You may find another method

to solve this problem (determinant formula, etc.) which is

ok for check, but do not use "exact parameter values"

as your initial approximations. (We need to see convergence)

2. An air vehicle makes 2 passes by a point of

interest. The first pass starts at $t = 0s$ at location

$(10\,000, 5000, 1000)$ m, with velocity:

$$\vec{V_1} = \begin{bmatrix} 9.315322 \\ 52.829\,815 \\ 0 \end{bmatrix} m/s$$

The second pass starts at $t = 500\,s$

at location $(11865.808, 6550.165, 1000)$ m

with velocity: $$\vec{V_2} = \begin{bmatrix} 9.315322 \\ -52.829815 \\ 0 \end{bmatrix} m/s$$. __3D range observations__

to the point of interest on the ground $(z < 200\,m)$

are made at the following times:

t (s)	d (m)	
0	1721.09	
10	1448.17	
20	1345.76	first pass
30	1447.97	
40	1720.89	
500	1318.05	
510	1204.46	second pass
520	1317.85	

The ground point is to the right of
both trajectories. Positions and Velocities
of vehicle are known exactly. Use
__indirect observations__ to find the
coordinates of the unknown point.
All observations have __equal weights__.
Why does first trajectory only fail?