# AIML Matrix Assignment

## Using Beamer

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# Question

The sides of a rhombus ABC are parallel to the lines
$(1\ -1)x + 2 = 0$
$(7\ -1)x + 3 = 0$
If the diagonals of the rhombus intersect at P = (1,2) and the vertex A (different) from the origin is on the y-axis, then find the ordinate of A.

# Information

Equation of first straight line given [1 -1]X + 2 =0
Equation of second straight line given [7 -1]X + 3 =0
Point given (1,2)
Equation of angle bisector [1 -1]X/norm value + 2 = +[7 -1]X/norm value + 3
Other diagonal
X/norm value + 2 = -[7 -1]X/norm value + 3
These angle bisectors give us the equations of the diagonals

# Continued

we have the slope and point of intersection
X = A + $\lambda$(A-B)
The diagonal is supposed to intersect the y axis
So the x coordinate is 0
And we get the y coordinate

# Code

```
import numpy as np
import matplotlib.pyplot as plt
A = np.array([1,-1])
B = np.array([7,-1])
C = np.linalg.norm(A)
D = np.linalg.norm(B)

E = np.array([(A[0]/C),(A[1]/C)])
F = np.array([(B[0]/D),(B[1]/D)])
G = E-F
H = E+F
slope1 = (G[1]/G[0])
slope2 = (H[1]/H[0])

POI = np.array([1,2])
x = np.linspace(0.,5.)
```

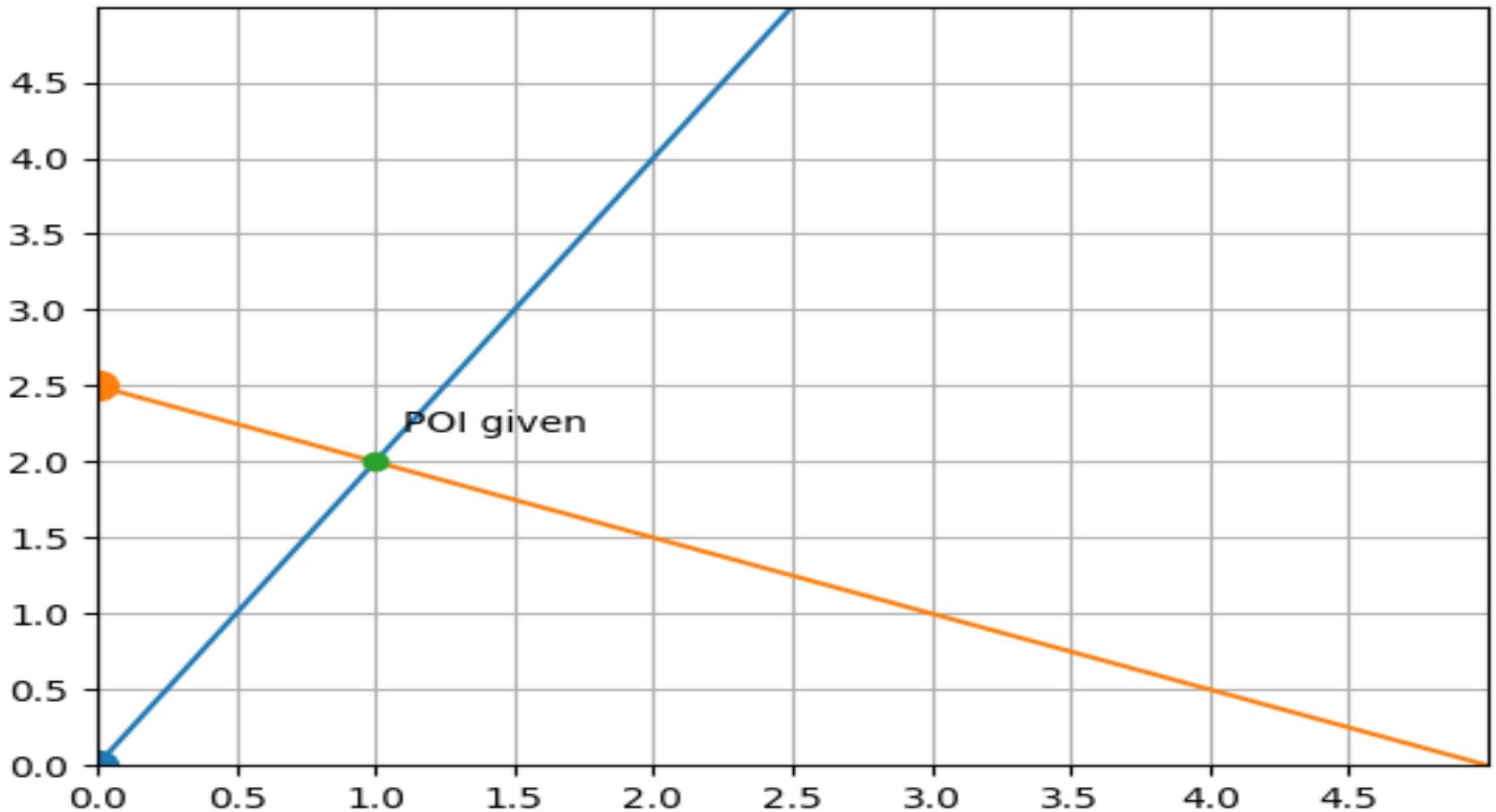
```
fig,ax = plt.subplots()
ax.plot(x,(slope1*(x-(POI[0]))+POI[1]),'-o',markersize=10,mark
ax.plot(x,(slope2*(x-(POI[0]))+POI[1]),'-o',markersize=10,mark

ax.set_xlim((0.,5.))
ax.set_ylim((0.,5.))

ax.xaxis.set_ticks(np.arange(0.,5.,0.5))
ax.yaxis.set_ticks(np.arange(0.,5.,0.5))

plt.show()
point1 = np.array([0,(slope1*(0-(POI[0]))+POI[1])])
point2 = np.array([0,(slope2*(0-(POI[0]))+POI[1])])
```

```
if point1[1] != 0:
  print(point1)
else:
  print(point2)
```

# Solution

Answer : (0,2.5)

# Plot



Thank You!