MATRIX PROJECT

Course code:1390

Vamshika.K (EE17BTECH11045) Geyasree.K (EP17BTECH11009)

Indian Institute of Technology, Hyderabad

14 February, 2019

Outline

1. PROBLEM
   - GEOMETRY QUESTION
   - MATRIX TRANSFORMATION FOR GEOMETRY PROBLEM
2. SOLUTION

Outline

1. PROBLEM
   - GEOMETRY QUESTION
   - MATRIX TRANSFORMATION FOR GEOMETRY PROBLEM
2. SOLUTION

GEOMETRY PROBLEM

- Let PS be the median of the triangle with vertices P(2,2) , Q(6,-1) and R(7,3). The equation of the line passing through (1,-1) and parallel to PS is ?

Outline

1. PROBLEM
   - GEOMETRY QUESTION
   - MATRIX TRANSFORMATION FOR GEOMETRY PROBLEM
2. SOLUTION

MATRIX TRANSFORMATION FOR GEOMETRY PROBLEM

- Let PS be the median of the triangle with vertices P=$\begin{pmatrix} 2 \\ -2 \end{pmatrix}$, Q =$\begin{pmatrix} 6 \\ -1 \end{pmatrix}$and R= $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$.
- The equation of line passing through A =$\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ and parallel to PS is?

SOLUTION

- P=[2,2]; S=(Q+R)/2; S=[13/2,1]
- Equation of line parallel to PS and passing through A[1,-1] is n.m=0
  n=normal vector m=direction vector=(x-A)

$$n = \begin{pmatrix} S & -P \end{pmatrix} \tag{1}$$

$$n^T = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} 9/2 \\ -1 \end{pmatrix} = \begin{pmatrix} -1 \\ -9/2 \end{pmatrix} \tag{2}$$

SOLUTION

$$C = \begin{pmatrix} -1 & -9/2 \end{pmatrix} \tag{3}$$

$$m = \begin{pmatrix} x \\ y \end{pmatrix} - \begin{pmatrix} 1 \\ -1 \end{pmatrix} \tag{4}$$

$$C \cdot m = 0 \tag{5}$$

SOLUTION

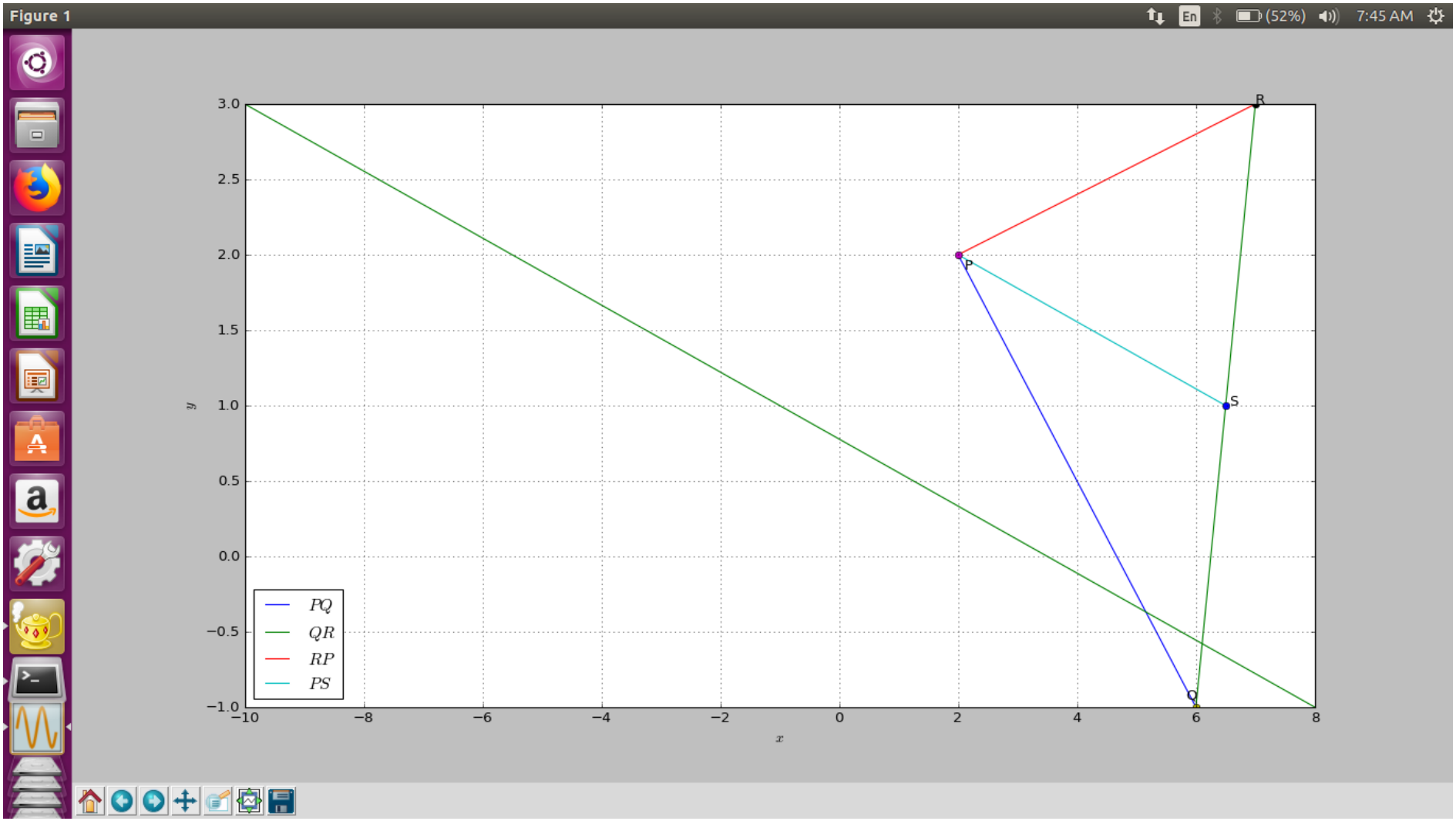
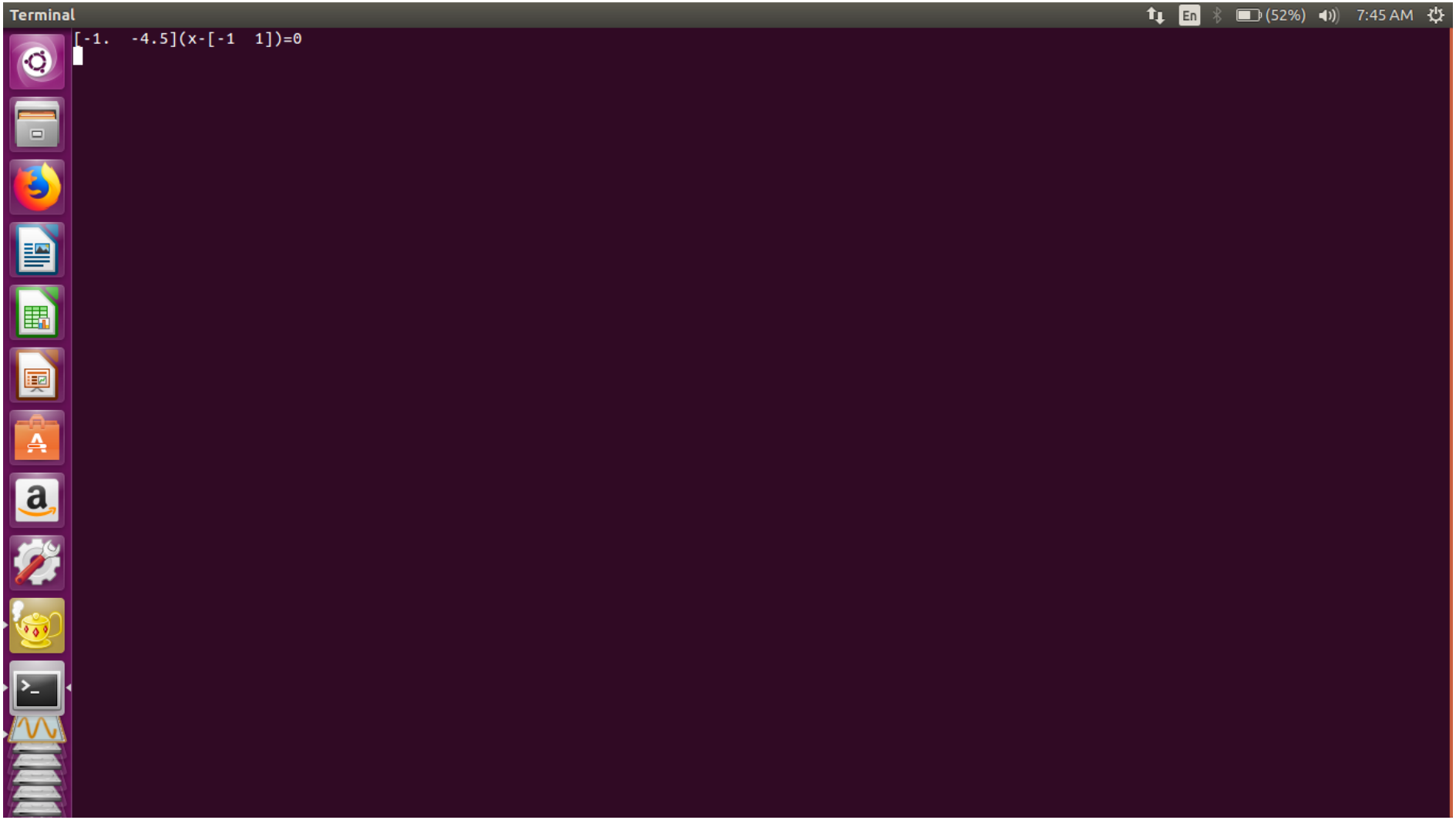
$$\begin{pmatrix} -1 & -9/2 \end{pmatrix} \cdot \left(\begin{pmatrix} x \\ y \end{pmatrix} - \begin{pmatrix} 1 \\ -1 \end{pmatrix} \right) = 0 \tag{6}$$

$$x \cdot (-1) + y \cdot (-9/2) = 7/2 \tag{7}$$

SOLUTION

- Therefore the equation is $2x + 9y + 7 = 0$

DIAGRAM



DIAGRAM