Assignment 1

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Area of Triangle

***Abstract*—This document contains the solution to find the Area of a Triangle, given the coordinates of the vertices.**

Download all python codes from

https://github.com/vishu1302/Introduction_to_AI-ML.git/Assignment_1.ipynb

Download latex-tikz codes from

https://github.com/vishu1302/Introduction_to_AI-ML.git/main.tex

1 Problem

Solve: Problem set: Vector2, Example-2,3

Find the areas of the triangles the coordinates of whose angular points are respectively: (5,2), (-9,-3) and (-3,-5)

2 Solution

The vertices are:

$$a = \begin{bmatrix} 5 & 2 \end{bmatrix}$$

$$b = \begin{bmatrix} -9 & -3 \end{bmatrix}$$

$$c = \begin{bmatrix} -3 & -5 \end{bmatrix}$$

We find sides by matrix subtraction
$sideab = (a - b)$

$$sideab = \begin{bmatrix} 14 & 5 \end{bmatrix}$$

$sideac = (a - c)$

$$sideac = \begin{bmatrix} 8 & 7 \end{bmatrix}$$

Now Area of triangle is given by:
Area of triangle is half the area of parallelogram formed $Area = \frac{1}{2} * sideab \times sideac$

$$Area = 0.5 * \begin{vmatrix} 14 & 5 \\ 8 & 7 \end{vmatrix}$$

$$Area = 29$$

Substituting value from equation in equation we'll get area of triangle:

$$\implies \frac{1}{2}(58) = 29 units^2$$