Random Vector Assignment

EE22BTECH11043 - RAMBHA SATVIK

The randomly generated vectors are:

$$\mathbf{A} = \begin{pmatrix} -4 \\ 5 \end{pmatrix} \tag{1}$$

$$\mathbf{B} = \begin{pmatrix} -5 \\ -6 \end{pmatrix} \tag{2}$$

$$\mathbf{C} = \begin{pmatrix} 3 \\ -5 \end{pmatrix} \tag{3}$$

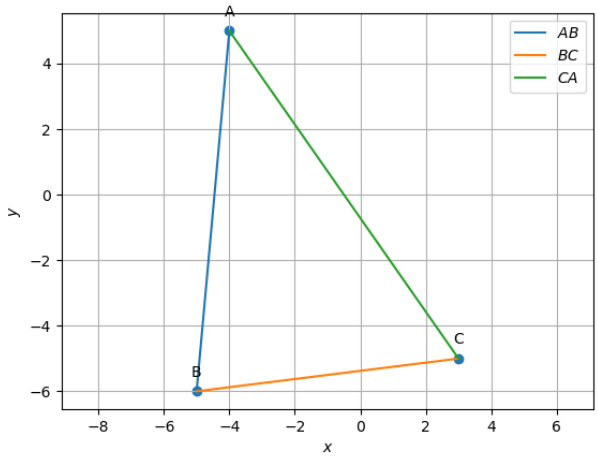

Fig. 0. Vectors

I. VECTORS

Parameter	Value	Description
$\mathbf{m_1}$	$\begin{pmatrix} 1 \\ 11 \end{pmatrix}$	Direction vector of AB
$\mathbf{m_2}$	$\begin{pmatrix} 8 \\ 1 \end{pmatrix}$	Direction vector of BC
$\mathbf{m_3}$	$\begin{pmatrix} -7 \\ 10 \end{pmatrix}$	Direction vector of CA
Length of Side	11.045	AB
Length of Side	8.062	BC
Length of Side	12.206	CA
$\mathbf{n}^\top$	$\begin{pmatrix} -11 \\ 1 \end{pmatrix}$	AB
c	49	
$\mathbf{n}^\top$	$\begin{pmatrix} 1 \\ -8 \end{pmatrix}$	BC
c	43	
$\mathbf{n}^\top$	$\begin{pmatrix} 10 \\ 7 \end{pmatrix}$	CA
c	-5	
Area	43.5	ABC
Angle	40.186	A
Angle	77.680	B
Angle	62.134	C

TABLE 0
VECTORS

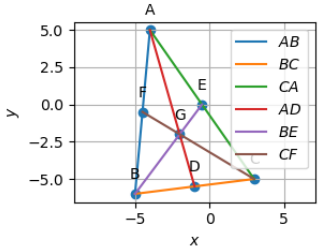

Fig. 0. Medians

II. MEDIAN

Parameter	Value	Description
Coordinates	$\begin{pmatrix} -1 \\ -5.5 \end{pmatrix}$	D (midpoint of BC)
Coordinates	$\begin{pmatrix} -0.5 \\ 0 \end{pmatrix}$	E (midpoint of CA)
Coordinates	$\begin{pmatrix} -4.5 \\ -0.5 \end{pmatrix}$	F (midpoint of AB)
$\mathbf{n}^\top$	$\begin{pmatrix} -10.5 \\ -3 \end{pmatrix}$	AD
c	27	
$\mathbf{n}^\top$	$\begin{pmatrix} 6 \\ -4.5 \end{pmatrix}$	BE
c	-3	
$\mathbf{n}^\top$	$\begin{pmatrix} 4.5 \\ 7.5 \end{pmatrix}$	CF
c	-24	
Centroid (G)	$\begin{pmatrix} -2 \\ -2 \end{pmatrix}$	Intersection of BE and CF

TABLE 0
MEDIAN

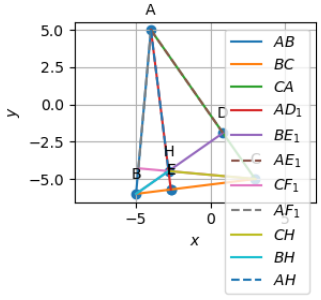

Fig. 0. Altitude

III. ALTITUDE

Parameter	Value	Description
$\mathbf{n}^\top$	$\begin{pmatrix}8\\1\end{pmatrix}$	AD_1
c	-27	
$\mathbf{n}^\top$	$\begin{pmatrix}-7\\10\end{pmatrix}$	BE_1
c	-3	
$\mathbf{n}^\top$	$\begin{pmatrix}-1\\-11\end{pmatrix}$	CF_1
c	52	
Orthocentre (H)	$\begin{pmatrix}-2.82\\-4.47\end{pmatrix}$	Intersection of BE_1 and CF_1

TABLE 0
ALTITUDE

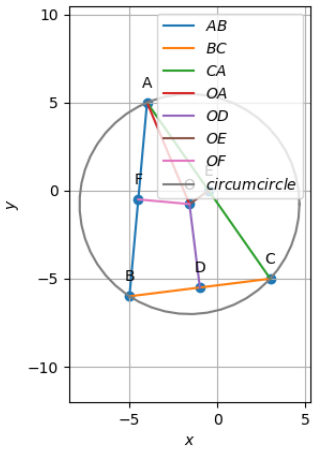

Fig. 0. PERPENDICULAR BISECTORS

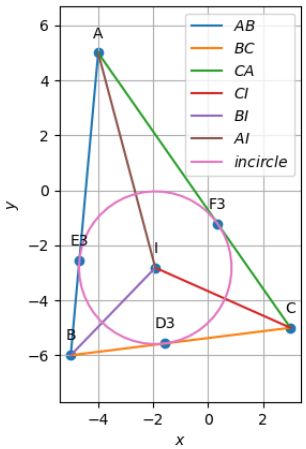

Fig. 0. ANGLE BISECTORS

IV. PERPENDICULAR BISECTORS

Parameter	Value	Description
$\mathbf{n}^\top$	$\begin{pmatrix}1\\11\end{pmatrix}$	OF (Perpendicular Bisector of AB)
c	-10	
$\mathbf{n}^\top$	$\begin{pmatrix}-8\\-1\end{pmatrix}$	OD (Perpendicular Bisector of BC)
c	13.5	
$\mathbf{n}^\top$	$\begin{pmatrix}7\\-10\end{pmatrix}$	OE (Perpendicular Bisector of CA)
c	-3.5	
Circumcentre (O)	$\begin{pmatrix}-1.59\\-0.76\end{pmatrix}$	Point of intersection of OE and OF
Radius	6.247	Radius of circumcircle

TABLE 0
PERPENDICULAR BISECTORS

V. ANGLE BISECTORS

Parameter	Value	Description
$\mathbf{n}^\top$	$\begin{pmatrix}-1.82\\-0.48\end{pmatrix}$	AI (Angle Bisector of A)
c	4.846	
$\mathbf{n}^\top$	$\begin{pmatrix}1.12\\-1.08\end{pmatrix}$	BI (Angle Bisector of B)
c	0.897	
$\mathbf{n}^\top$	$\begin{pmatrix}0.69\\1.57\end{pmatrix}$	CI (Angle Bisector of C)
c	5.047	
Incentre (I)	(0.24 -3.98)	Point of intersection of BI and CI
Distance	2.778	I from BC
Distance	2.778	I from AB
Distance	2.778	I from AC
Inradius	2.778	Radius of Incircle

TABLE 0
ANGLE BISECTORS