

Random Vector Assignment

EE22BTECH11052 - Sujal Gupta

The randomly generated vectors are:

$$\mathbf{A} = \begin{pmatrix} -6 \\ 0 \end{pmatrix} \quad (1)$$

$$\mathbf{B} = \begin{pmatrix} -4 \\ 3 \end{pmatrix} \quad (2)$$

$$\mathbf{C} = \begin{pmatrix} -2 \\ 0 \end{pmatrix} \quad (3)$$

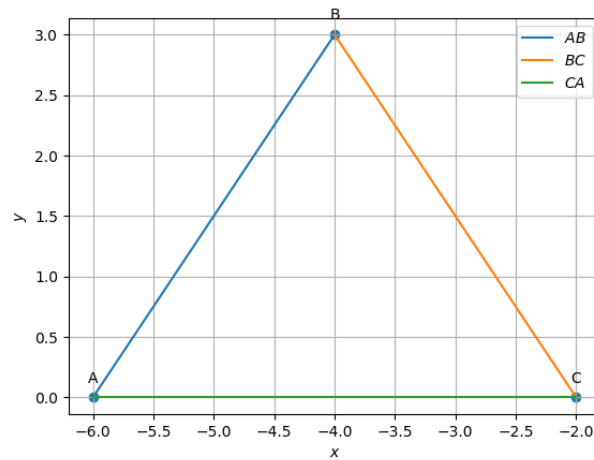


Fig. 0. Vectors

I. VECTORS

parameter	value	description
A	$\begin{pmatrix} -6 \\ 0 \end{pmatrix}$	vector A
B	$\begin{pmatrix} -4 \\ 3 \end{pmatrix}$	vector B
C	$\begin{pmatrix} -2 \\ 0 \end{pmatrix}$	vector C
m₁	$\begin{pmatrix} 2 \\ 3 \end{pmatrix}$	<i>AB</i>
m₂	$\begin{pmatrix} 2 \\ -3 \end{pmatrix}$	<i>BC</i>
m₃	$\begin{pmatrix} -4 \\ 0 \end{pmatrix}$	<i>CA</i>
$\ \mathbf{B} - \mathbf{C}\ $	(3.60)	length of <i>BC</i>
$\text{rank} \begin{pmatrix} 1 & 1 & 1 \\ A & B & C \end{pmatrix}$	3	non-collinear
n₁^T	$\begin{pmatrix} -3 \\ 2 \end{pmatrix}$	AB
<i>c₁</i>	18	
n₂^T	$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$	BC
<i>c₂</i>	-6	
n₃^T	$\begin{pmatrix} 0 \\ -4 \end{pmatrix}$	AC
<i>c₃</i>	-12	
Area	6	area of triangle
$\angle A$	56.30°	Angle
$\angle B$	67.38	
$\angle C$	56.30	

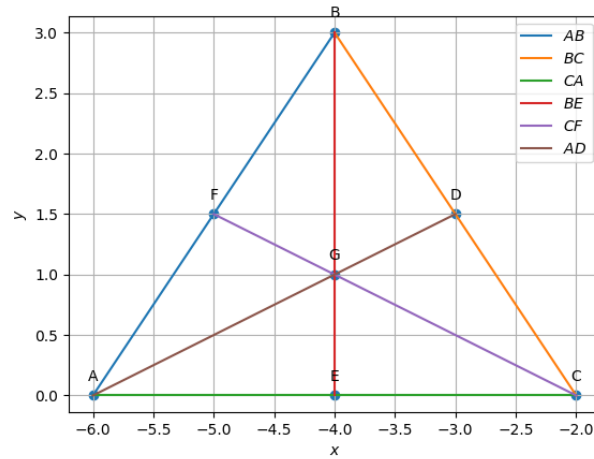
TABLE 0
VECTORS

Fig. 0. Medians

II. MEDIAN

parameter	value	description
D	$\begin{pmatrix} -3 \\ 1.5 \end{pmatrix}$	midpoint of AB
E	$\begin{pmatrix} -4 \\ 0 \end{pmatrix}$	midpoint of BC
F	$\begin{pmatrix} -5 \\ 1.5 \end{pmatrix}$	midpoint of CA
\mathbf{n}_4^T	$(-1.5 \quad 3)$	normal eq of AD
c_4	15	
\mathbf{n}_5^T	$(3 \quad 0)$	
c_5	-12	normal eq of BE
\mathbf{n}_6^T	$(-1.5 \quad -3)$	
c_6	-3	normal eq of CF
G	$\begin{pmatrix} -4 \\ 1 \end{pmatrix}$	intersection of BE and CF
collinearity	collinear	A, G, D are collinear
G	$\begin{pmatrix} -4 \\ 1 \end{pmatrix}$	centroid

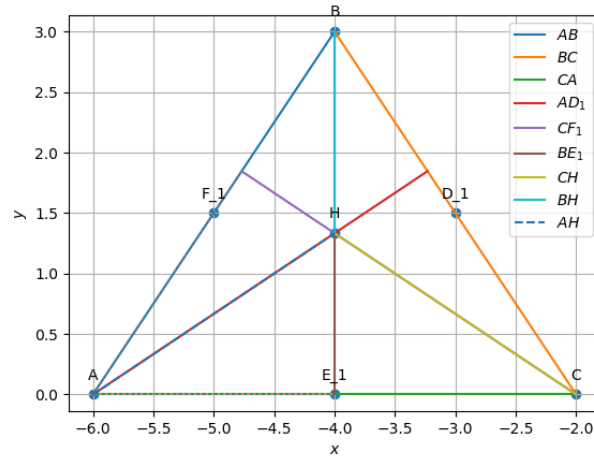
TABLE 0
MEDIAN

Fig. 0. Altitude

III. ALTITUDE

parameter	value	description
\mathbf{D}_1	$\begin{pmatrix} -3.23 \\ 1.84 \end{pmatrix}$	altitude foot from A
\mathbf{E}_1	$\begin{pmatrix} -4 \\ 0 \end{pmatrix}$	altitude foot from B
\mathbf{F}_1	$\begin{pmatrix} -4.79 \\ 1.84 \end{pmatrix}$	altitude foot from C
\mathbf{n}_7^T	$\begin{pmatrix} -1.84 & 2.76 \end{pmatrix}$	AD_1
c_7	15.69	
\mathbf{n}_8^T	$\begin{pmatrix} 3 & 0 \end{pmatrix}$	BE_1
c_8	-12	
\mathbf{n}_9^T	$\begin{pmatrix} -1.84 & -2.76 \end{pmatrix}$	CF_1
c_9	-0.92	
\mathbf{H}	$\begin{pmatrix} -4 \\ 1.33 \end{pmatrix}$	Orthocentre

TABLE 0
ALTITUDE

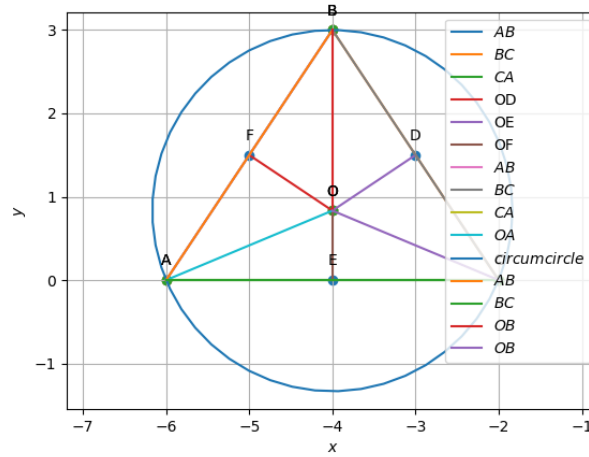


Fig. 0. PERPENDICULAR BISECTORS

IV. PERPENDICULAR BISECTORS

parameter	value	description
\mathbf{n}_{10}^T	$\begin{pmatrix} -2 & -3 \end{pmatrix}$	Perpendicular bisector of AB
c_{10}	5.50	
\mathbf{n}_{11}^T	$\begin{pmatrix} -2 & 3 \end{pmatrix}$	Perpendicular bisector of BC
c_{11}	10.5	
\mathbf{n}_{12}^T	$\begin{pmatrix} 4 & 0 \end{pmatrix}$	Perpendicular bisector of CA
c_{12}	-16	
\mathbf{O}	$\begin{pmatrix} -4 \\ 0.833 \end{pmatrix}$	Circumcentre
r_c	2.166	$OA = OB = OC$
$\angle BOC$	112.6°	Angle BOC
$\angle BAC$	56.3°	Angle BAC

TABLE 0
PERPENDICULAR BISECTORS

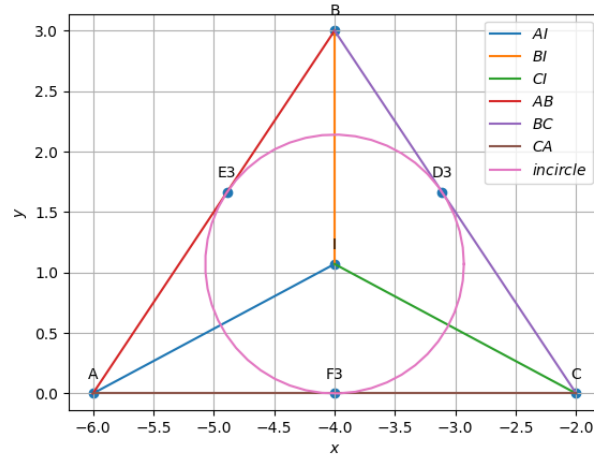


Fig. 0. ANGLE BISECTORS

V. ANGLE BISECTORS

parameter	value	description
\mathbf{n}_{13}^T	$\begin{pmatrix} 0.83 & -1.55 \end{pmatrix}$	Angular bisector of A
c_{13}	-4.99	
\mathbf{n}_{14}^T	$\begin{pmatrix} 0 & -1.10 \end{pmatrix}$	Angular bisector of B
c_{14}	-3.32	
\mathbf{n}_{15}^T	$\begin{pmatrix} 0.83 & -0.44 \end{pmatrix}$	Angular bisector of C
c_{15}	-1.66	
I	$\begin{pmatrix} -4 \\ 1.07 \end{pmatrix}$	Incentre
r_i	1.07	Inradius
$\angle BAI$	28.154°	Angle BAI
$\angle CAI$	28.154°	Angle CAI
r_{AB}, r_{BC}, r_{CA}	1.070	$r_{AB} = r_{BC} = r_{CA}$
\mathbf{D}_3	$\begin{pmatrix} -3.10 \\ 1.66 \end{pmatrix}$	\mathbf{D}_3
\mathbf{E}_3	$\begin{pmatrix} -4.89 \\ 1.66 \end{pmatrix}$	\mathbf{E}_3
\mathbf{F}_3	$\begin{pmatrix} -4 \\ 0 \end{pmatrix}$	\mathbf{F}_3
length AE_3, AF_3	2	$AE_3 = AF_3$
length BD_3, BF_3	1.606	$BD_3 = BF_3$
length CD_3, CE_3	2	$CD_3 = CE_3$

TABLE 0
ANGLE BISECTORS