Random Number Assignment

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Consider the vertices,

$$\mathbf{A} = \begin{pmatrix} -6 \\ -3 \end{pmatrix} \tag{1}$$

$$\mathbf{B} = \begin{pmatrix} -1 \\ 0 \end{pmatrix} \tag{2}$$

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

I. VECTORS

Parameter	Value	Description
$\mathbf{m_1}$	$\begin{pmatrix} -1 \\ -5 \end{pmatrix}$	Direction vector of AB
$\mathbf{m_2}$	$\begin{pmatrix} 4 \\ -6 \end{pmatrix}$	Direction vector of BC
$\mathbf{m_3}$	$\begin{pmatrix} -1 \\ -1 \end{pmatrix}$	Direction vector of CA
Length of Side	5.1	AB
Length of Side	7.07	BC
Length of Side	4	CA
$n^\top$	$\begin{pmatrix} -1 & -5 \end{pmatrix}$	AB
c	26	
$n^\top$	$\begin{pmatrix} 5 & 5 \end{pmatrix}$	BC
c	-10	
$n^\top$	$\begin{pmatrix} -4 & 0 \end{pmatrix}$	CA
c	4	
Area	10	ABC
Angle	101.31	A
Angle	33.69	B
Angle	45	C

TABLE 0
TABLE 1

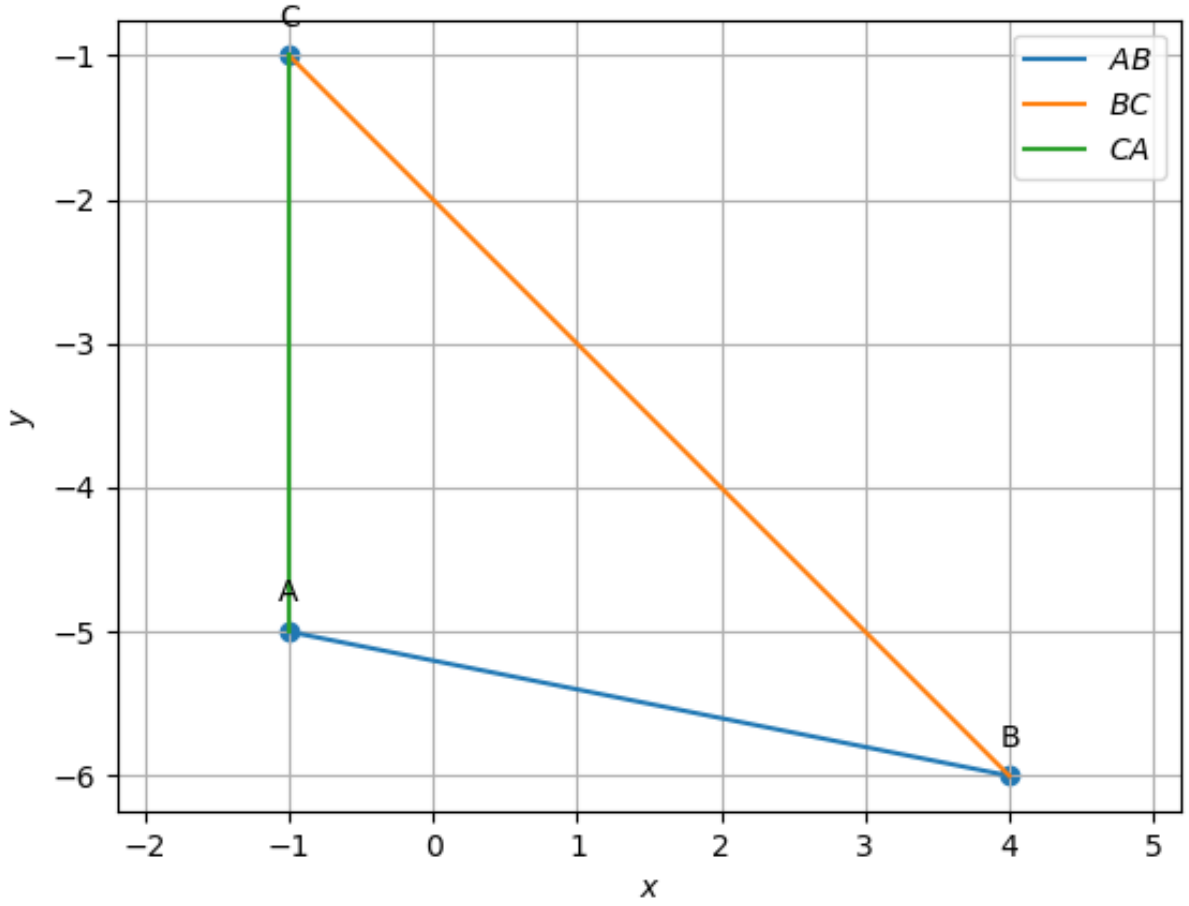

Fig. 0. Triangle ABC

II. MEDIANS

Parameter	Value	Description
Coordinates	$\begin{pmatrix} 1.5 \\ -3.5 \end{pmatrix}$	**D** (midpoint of AB)
Coordinates	$\begin{pmatrix} -1 \\ -3 \end{pmatrix}$	**E** (midpoint of BC)
Coordinates	$\begin{pmatrix} 1.5 \\ -5.5 \end{pmatrix}$	**F** (midpoint of CA)
$n^\top$	$\begin{pmatrix} 1.5 & -2.5 \end{pmatrix}$	AD
c	11	
$n^\top$	$\begin{pmatrix} 3 & 5 \end{pmatrix}$	BE
c	-18	
$n^\top$	$\begin{pmatrix} -4.5 & -2.5 \end{pmatrix}$	CF
c	7	
Orthocentre (G)	$\begin{pmatrix} (0.67 \\ -4 \end{pmatrix}$	Point of intersection of BE and CF

TABLE 0
TABLE 2

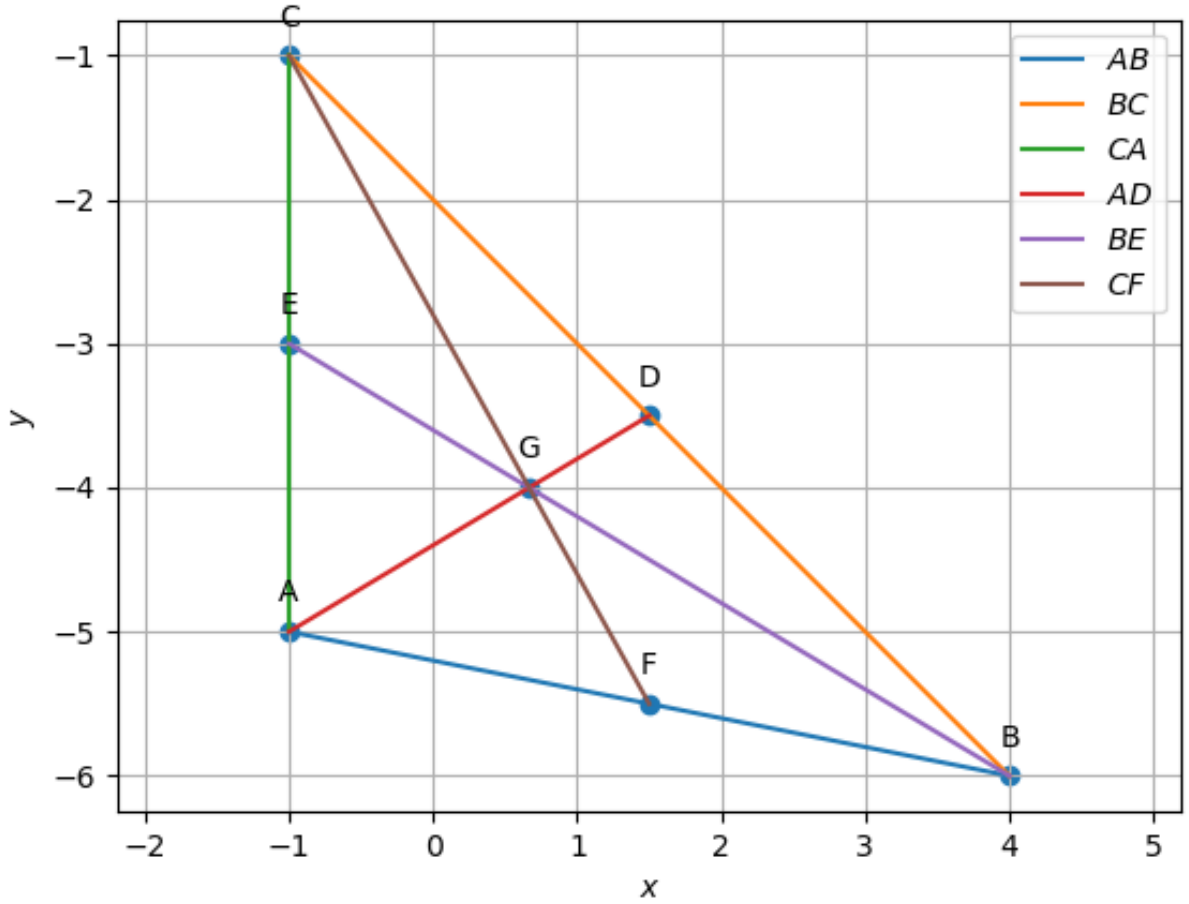

Fig. 0. Triangle ABC with medians AD, BE and CF

III. ALTITUDES

Parameter	Value	Description
n	$\begin{pmatrix} 5 \\ -5 \end{pmatrix}$	Normal Vector of AD_1
$n^\top$	$\begin{pmatrix} -5 & 5 \end{pmatrix}$	AD_1
c	-20	
$n^\top$	$\begin{pmatrix} 0 & -4 \end{pmatrix}$	BE_1
c	24	
$n^\top$	$\begin{pmatrix} 5 & -1 \end{pmatrix}$	CF_1
c	-4	
Orthocentre (**H**	(-2 -6)	Intersection of BE_1 and CF_1

TABLE 0
TABLE 3

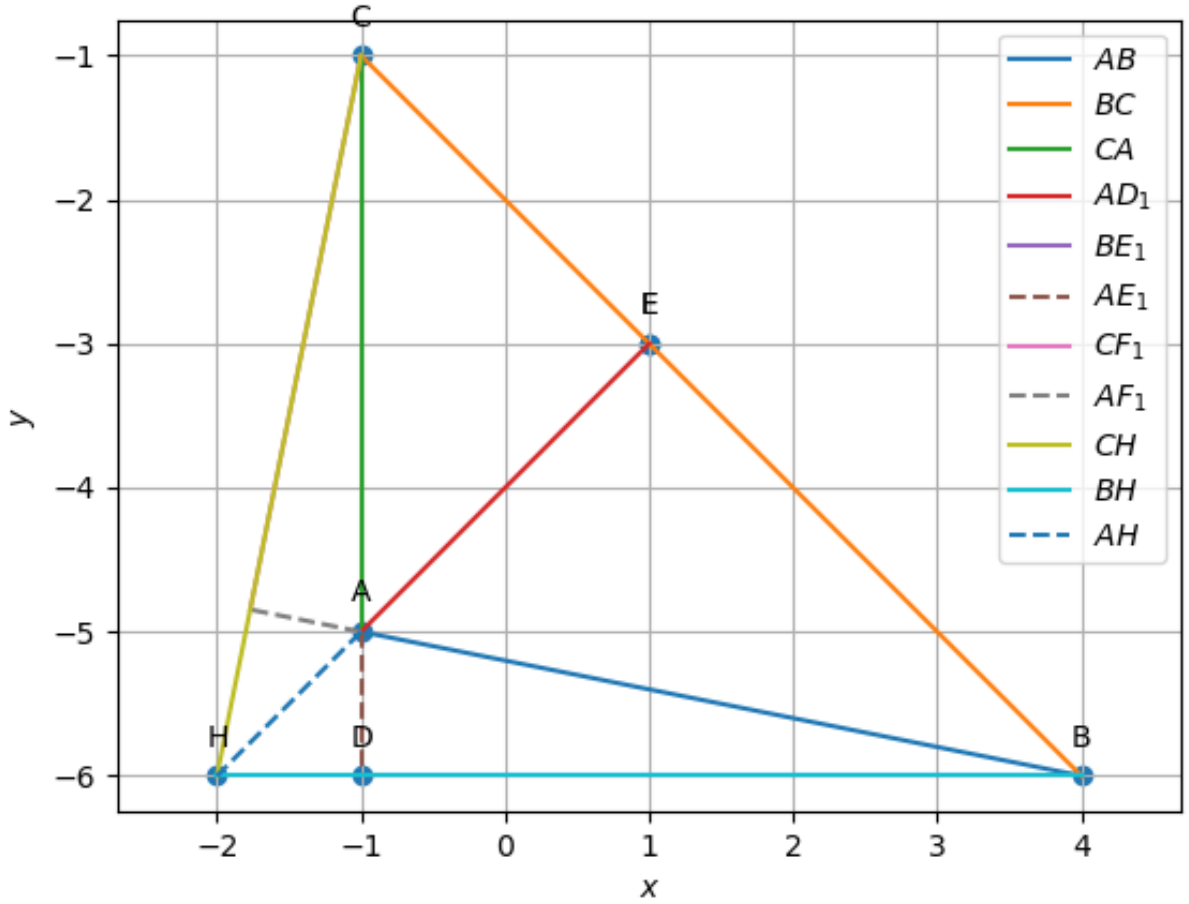

Fig. 0. Triangle ABC with altitudes AD_1, BE_1 and CF_1

IV. PERPENDICULAR BISECTOR

Parameter	Value	Description
$n^\top$	$\begin{pmatrix}-5 & 1\end{pmatrix}$	OF (Perpendicular Bisector of AB)
c	-13	
$n^\top$	$\begin{pmatrix}5 & -5\end{pmatrix}$	OD (Perpendicular Bisector of BC)
c	25	
$n^\top$	$\begin{pmatrix}0 & 4\end{pmatrix}$	OE (Perpendicular Bisector of CA)
c	-12	
Circumcentre (**O**)	$\begin{pmatrix}2\\-3\end{pmatrix}$	Point of intersection of OE and OF
Radius	3.6	Radius of circumcircle
Angle	202.6	BOC
Angle	101.3	BAC

TABLE 0
TABLE 4

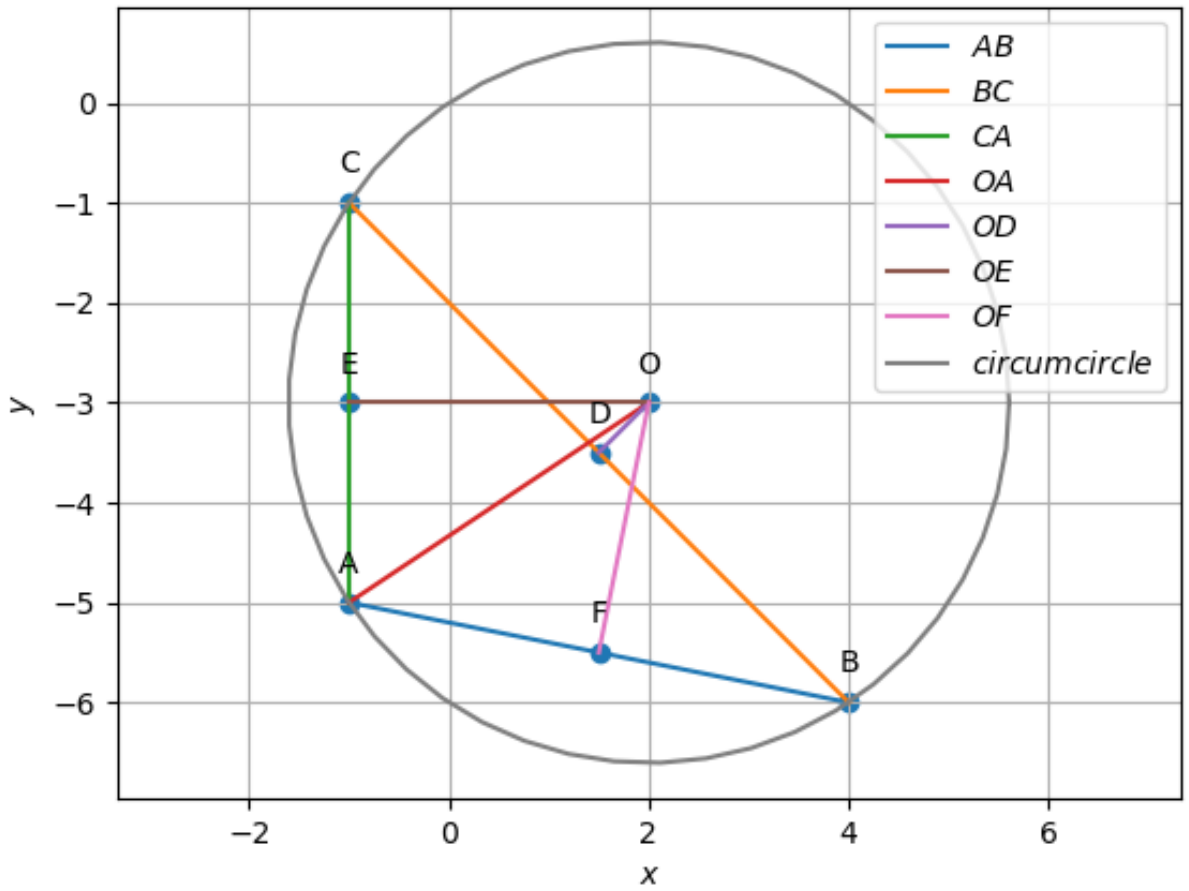

Fig. 0. circumcircle of triangle ABC with circumcentre O

V. ANGULAR BISECTOR

Parameter	Value	Description
$n^\top$	$\begin{pmatrix}0.8 & -0.98\end{pmatrix}$	AI (Angle Bisector of **A**)
c	4.1	
$n^\top$	$\begin{pmatrix}0.9 & 1.69\end{pmatrix}$	BI (Angle Bisector of **B**)
c	-6.51	
$n^\top$	$\begin{pmatrix}-1.71 & -0.71\end{pmatrix}$	CI (Angle Bisector of **C**)
c	5.24	
Incentre (**I**)	$\begin{pmatrix}0.24\\-3.98\end{pmatrix}$	Point of intersection of BI and CI
Distance	1.24	$\begin{pmatrix}I\end{pmatrix}$ from BC
Distance	1.24	$\begin{pmatrix}I\end{pmatrix}$ from AB
Distance	1.24	$\begin{pmatrix}I\end{pmatrix}$ from AC
Inradius	1.24	Radius of Incircle
$\mathbf{D_3}$	$\begin{pmatrix}1.11\\-3.11\end{pmatrix}$	Point of contact of incircle with BC
$\mathbf{E_3}$	$\begin{pmatrix}-0.005\\-5.19\end{pmatrix}$	Point of contact of incircle with AB
$\mathbf{F_3}$	$\begin{pmatrix}-1\\-3.98\end{pmatrix}$	Point of contact of incircle with AC
m	1.01	Length of AE_3
n	4.08	Length of BD_3
p	2.99	Length of CD_3

TABLE 0
TABLE 5

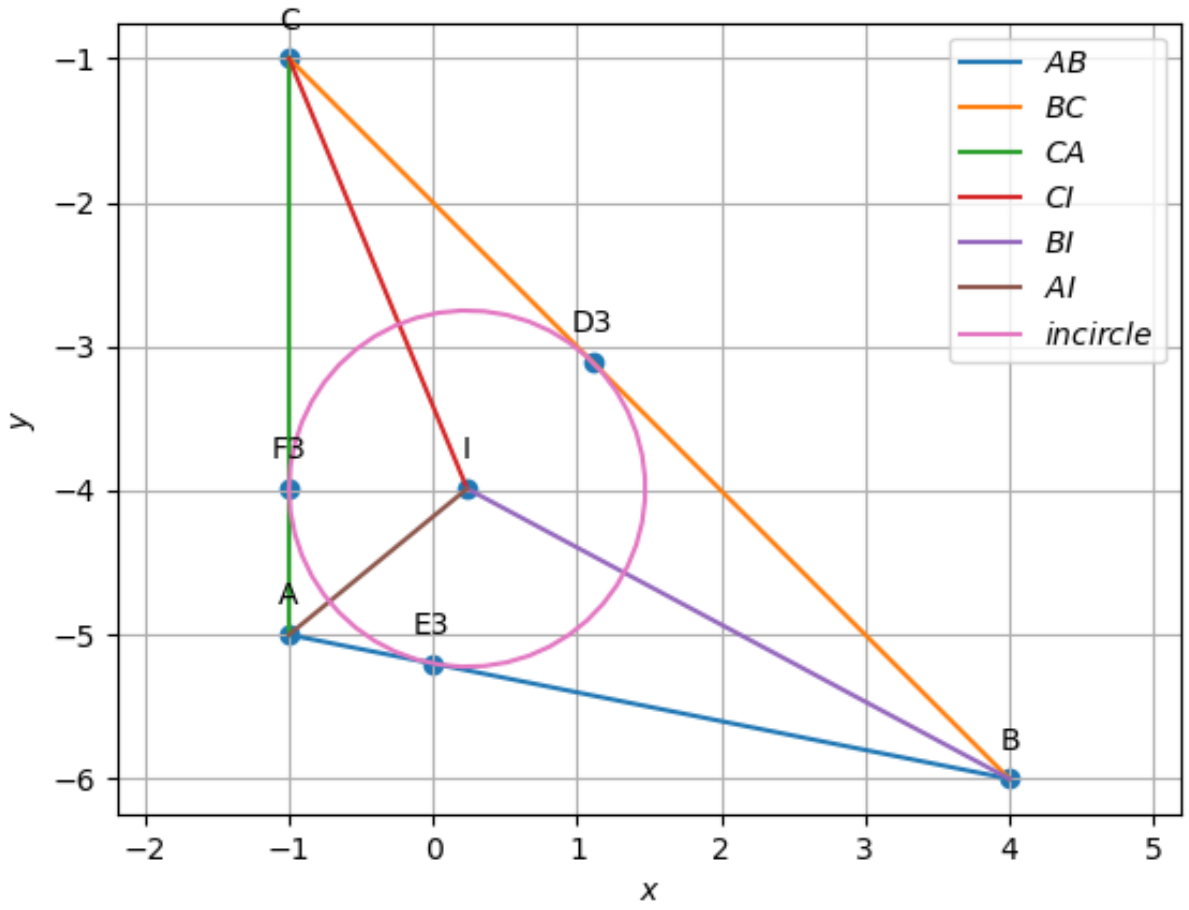

Fig. 0. incircle of triangle ABC with incentre I