Answer Key Table

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Consider the vertices,

$$\mathbf{A} = \begin{pmatrix} 3 \\ -4 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} -5 \\ -4 \end{pmatrix} \qquad \mathbf{C} = \begin{pmatrix} -6 \\ 3 \end{pmatrix} \tag{1}$$

I. VECTORS

parameter	value	description
$\mathbf{m_1}$	$\begin{pmatrix} -8 \\ 0 \end{pmatrix}$	$\mathbf{B} - \mathbf{A}$
$\mathbf{m_2}$	$\begin{pmatrix} -1 \\ 7 \end{pmatrix}$	$\mathbf{C} - \mathbf{B}$
$\mathbf{m_3}$	$\begin{pmatrix} 9 \\ -7 \end{pmatrix}$	$\mathbf{A} - \mathbf{C}$
$\|\mathbf{B} - \mathbf{A}\|$	8	AB
$\|\mathbf{C} - \mathbf{B}\|$	7.07	BC
$\|\mathbf{A} - \mathbf{C}\|$	11.4	AC
rank$\begin{pmatrix} 1 & 1 & 1 \\ \mathbf{A} & \mathbf{B} & \mathbf{C} \end{pmatrix}$	3	points are not collinear
$\mathbf{n_1}^\top$	$\begin{pmatrix} 0 & 8 \end{pmatrix}$	AB
c_1	-32	
$\mathbf{n_2}^\top$	$\begin{pmatrix} 7 & 1 \end{pmatrix}$	BC
c_2	-39	
$\mathbf{n_3}^\top$	$\begin{pmatrix} -7 & -9 \end{pmatrix}$	AC
c_3	15	
area	28	area of triangle
$\angle A$	37.87°	Angle
$\angle B$	98.13°	
$\angle C$	43.99°	

TABLE 0
TABLE 1

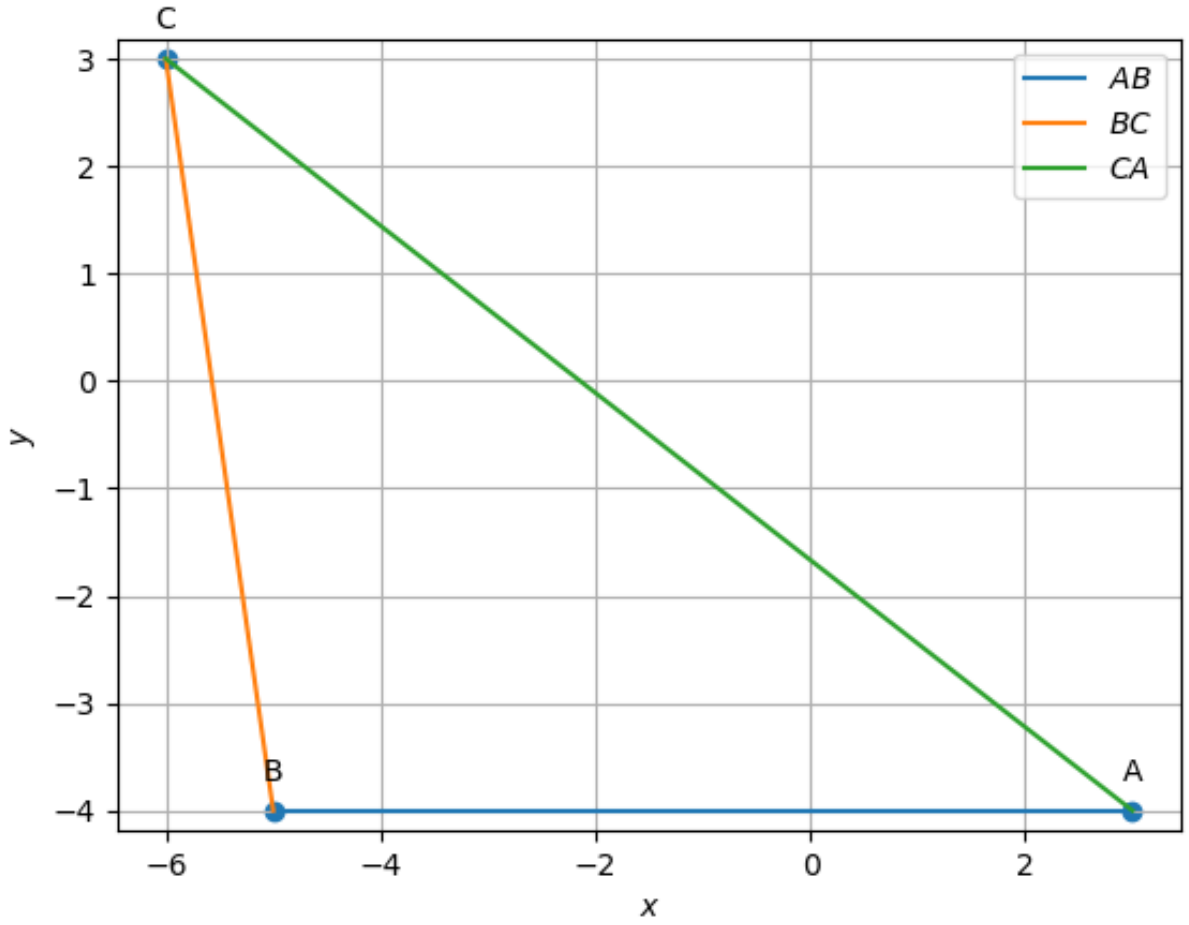

Fig. 0. Triangle ABC

II. MEDIANS

parameter	value	description
D	$\begin{pmatrix}-5.5\\-0.5\end{pmatrix}$	midpoint of line BC
E	$\begin{pmatrix}-1.5\\-0.5\end{pmatrix}$	midpoint of line AC
F	$\begin{pmatrix}-1\\-4\end{pmatrix}$	midpoint of line AB
$\mathbf{n_4}^\top$	$\begin{pmatrix}3.5 & 8.5\end{pmatrix}$	AD
c_4	-23.5	
$\mathbf{n_5}^\top$	$\begin{pmatrix}3.5 & -3.5\end{pmatrix}$	BE
c_5	-3.5	
$\mathbf{n_6}^\top$	$\begin{pmatrix}-7 & -5\end{pmatrix}$	CF
c_6	27	
G	$\begin{pmatrix}-2.66\\-1.66\end{pmatrix}$	centroid of triangle

TABLE 0
TABLE 2

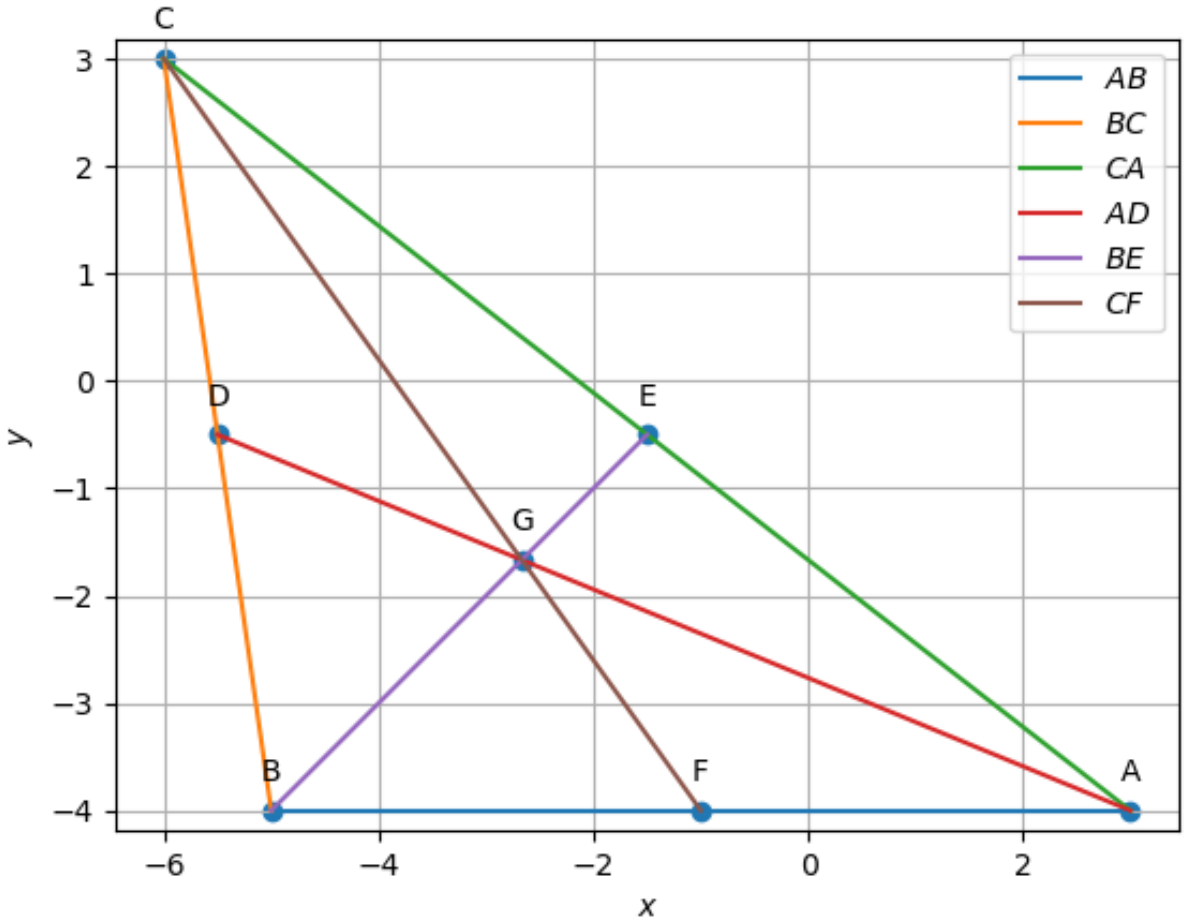

Fig. 0. Triangle ABC with medians AD, BE and CF

III. ALTITUDES

parameter	value	description
$\mathbf{n_7^\top}$	$\begin{pmatrix}-1 & -7\end{pmatrix}$	AD_1
c_7	-31	
$\mathbf{n_8^\top}$	$\begin{pmatrix}9 & -7\end{pmatrix}$	BE_1
c_8	-17	
$\mathbf{n_9^\top}$	$\begin{pmatrix}-8 & 0\end{pmatrix}$	CF_1
c_9	48	
$\mathbf{H}$	$\begin{pmatrix}-6 \\ -5.28\end{pmatrix}$	orthocentre of triangle

TABLE 0
TABLE 3

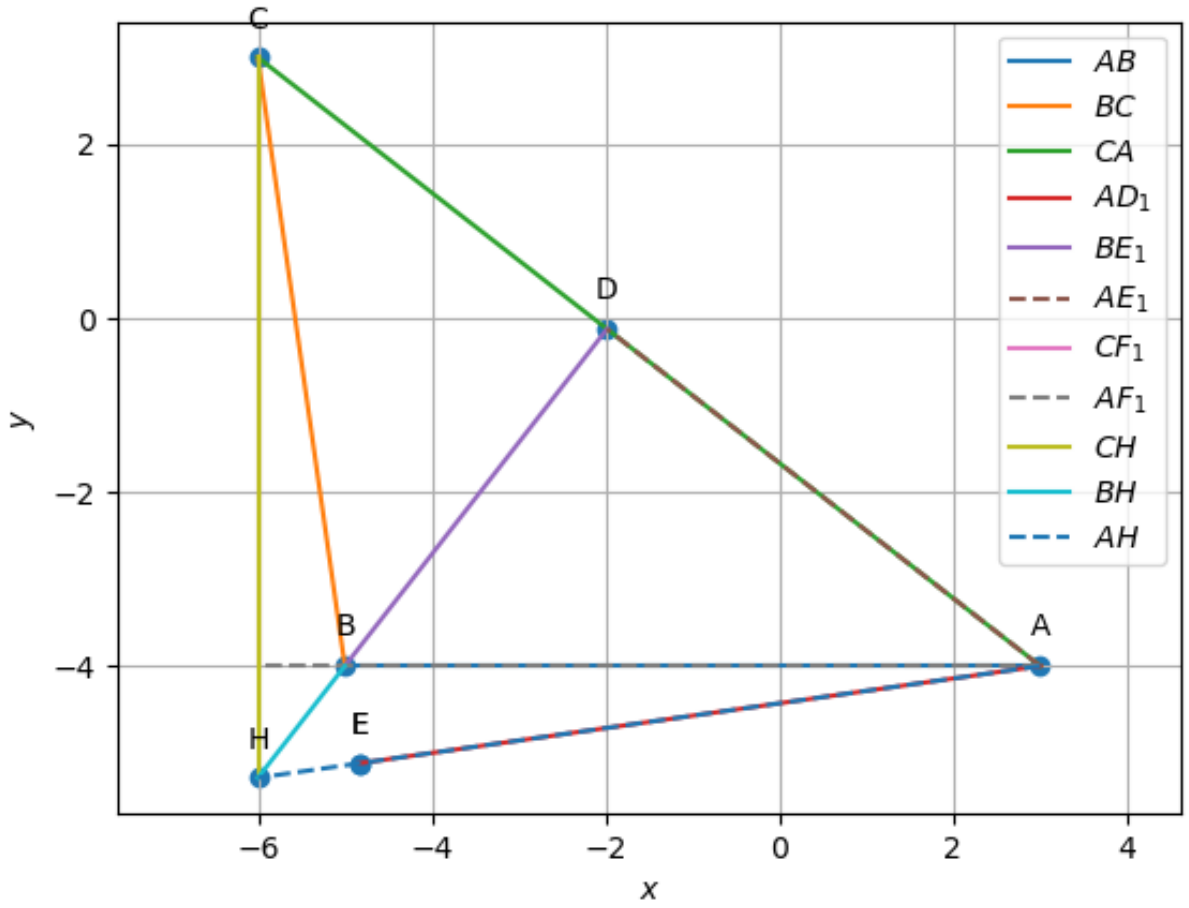

Fig. 0. Triangle ABC with altitudes AD_1, BE_1 and CF_1

IV. PERPENDICULAR BISECTOR

parameter	value	description
$\mathbf{n}_{10}^{\top}$	$\begin{pmatrix} 8 & 0 \end{pmatrix}$	Perpendicular bisector of AB
c_{10}	-8	
$\mathbf{n}_{11}^{\top}$	$\begin{pmatrix} 1 & -7 \end{pmatrix}$	Perpendicular bisector of BC
c_{11}	-2	
$\mathbf{n}_{12}^{\top}$	$\begin{pmatrix} -9 & 7 \end{pmatrix}$	Perpendicular bisector of CA
c_{12}	10	
$\mathbf{O}$	$\begin{pmatrix} -1 \\ 0.14 \end{pmatrix}$	Circumcircle
radius	2.18	

TABLE 0
TABLE 4

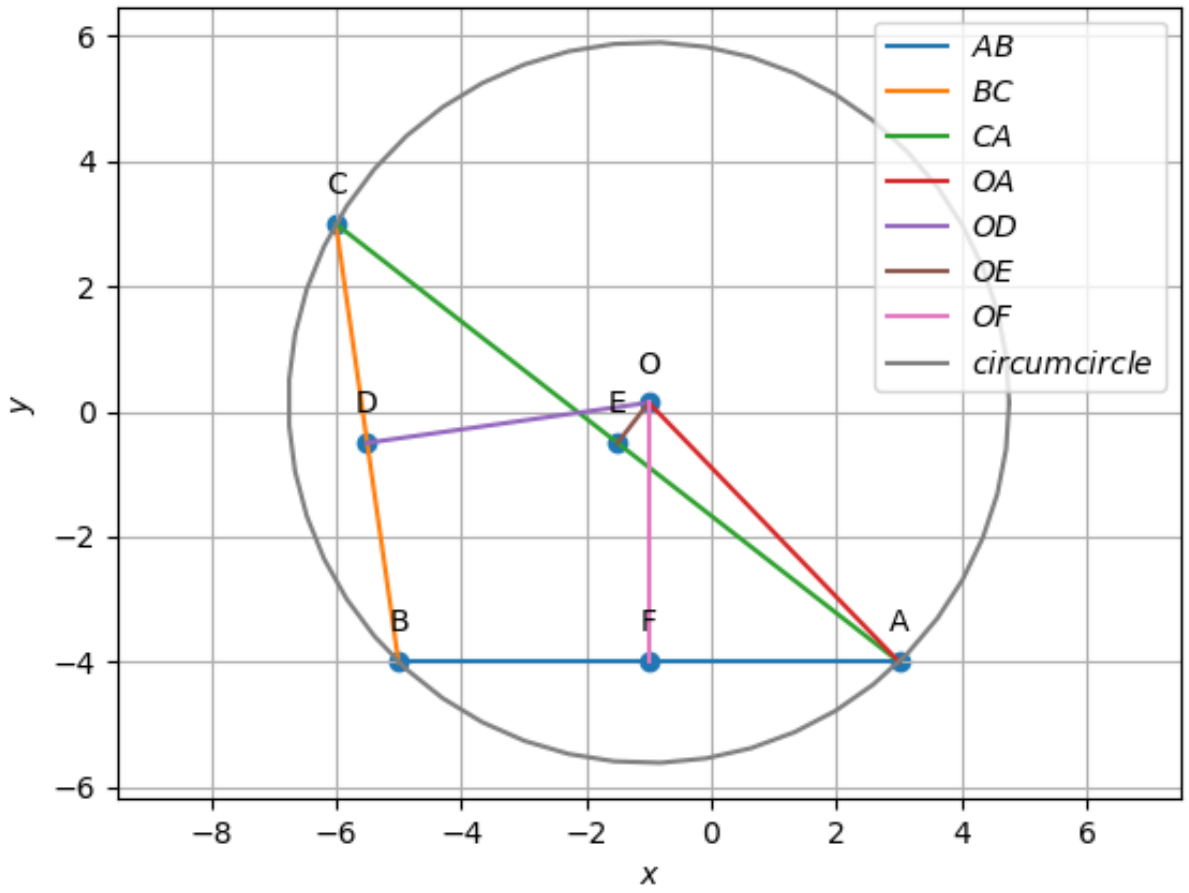

Fig. 0. circumcircle of triangle ABC with circumcentre O

V. ANGULAR BISECTOR

parameter	value	description
$\mathbf{n}_{13}^{\top}$	$\begin{pmatrix}0.61 & 1.78\end{pmatrix}$	Angular bisector of A
c_{13}	-5.31	
$\mathbf{n}_{14}^{\top}$	$\begin{pmatrix}0.98 & -0.85\end{pmatrix}$	Angular bisector of B
c_{14}	-1.51	
$\mathbf{n}_{15}^{\top}$	$\begin{pmatrix}-1.60 & -0.93\end{pmatrix}$	Angular bisector of C
c_{15}	-1.08	
$\mathbf{I}$	$\begin{pmatrix}-3.16\\-1.88\end{pmatrix}$	Incircle
radius	1.22	

TABLE 0
TABLE 5

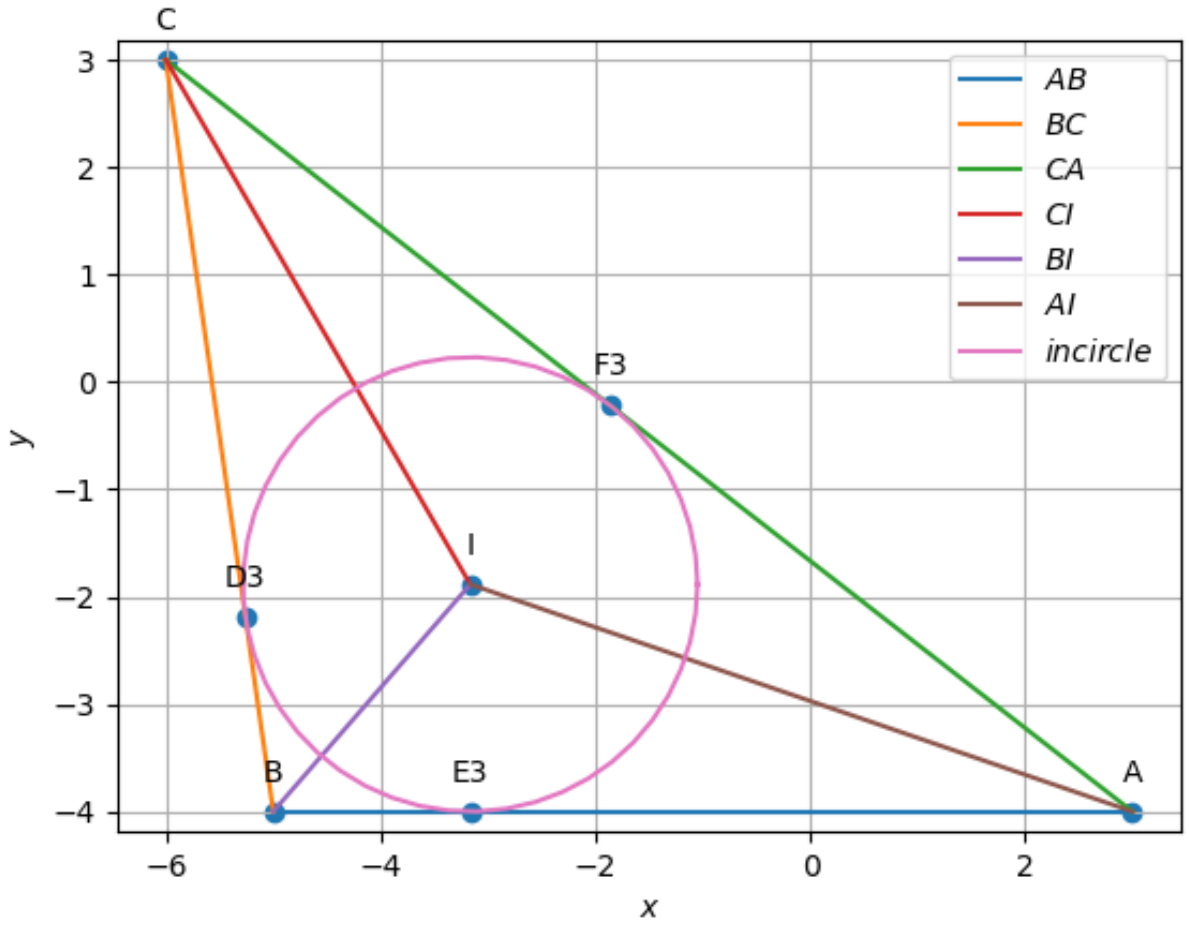

Fig. 0. incircle of triangle ABC with incentre I