1

Solution with figure

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Consider a triangle with vertices

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

$$\mathbf{B} = \begin{pmatrix} 4 \\ 5 \end{pmatrix} \tag{2}$$

$$\mathbf{C} = \begin{pmatrix} -1\\4 \end{pmatrix} \tag{3}$$

parameter	value	description
\mathbf{m}_1	$\begin{pmatrix} 9 \\ 4 \end{pmatrix}$	AB
\mathbf{m}_2	$\begin{pmatrix} -5 \\ -1 \end{pmatrix}$	ВС
m ₃	$\begin{pmatrix} -4 \\ -3 \end{pmatrix}$	AC
B - A	5.83	AB
C - B	6.40	BC
A - C	9.21	AC
rank	3	points are not collinear
$\mathbf{n}_{1}^{ op}$	(4 –9)	AB
c_1	-3	Ab
$\mathbf{n}_{2}^{ op}$	$\begin{pmatrix} -1 & 5 \end{pmatrix}$	D.C.
c_2	5	BC
$\mathbf{n}_{3}^{\scriptscriptstyle op}$	(-3 4)	AG
<i>c</i> ₃	-39	AC
area	18.5	area of triangle
$\angle A$	12.90740°	Angle
∠B	12.65255°	Angle
∠C	154.44003°	

TABLE 0 Vectors

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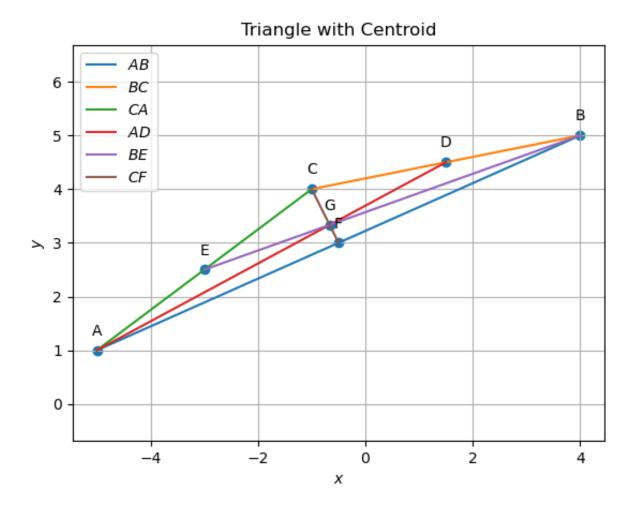


Fig. 0. Triangle

parameter	value	description
D	$\begin{pmatrix} 1.5 \\ -4.5 \end{pmatrix}$	midpoint of line BC
Е	$\begin{pmatrix} -3 \\ -2.5 \end{pmatrix}$	midpoint of line AC
F	$\begin{pmatrix} -0.5\\ 3 \end{pmatrix}$	midpoint of line AB
$\mathbf{n}_{4}^{ op}$	(3.5 -6.5)	AD
c_4	18	AD
$\mathbf{n}_{5}^{ op}$	(-2.5 7)	BE
c_5	4	DE
$\mathbf{n}_{6}^{ op}$	(-1 -0.5)	CF
c_6	-22	_
G	(-0.666666666666666666666666666666666666	75 dentroid of triangle
TABLE 0		

TRIANGLE WITH MIDPOINT

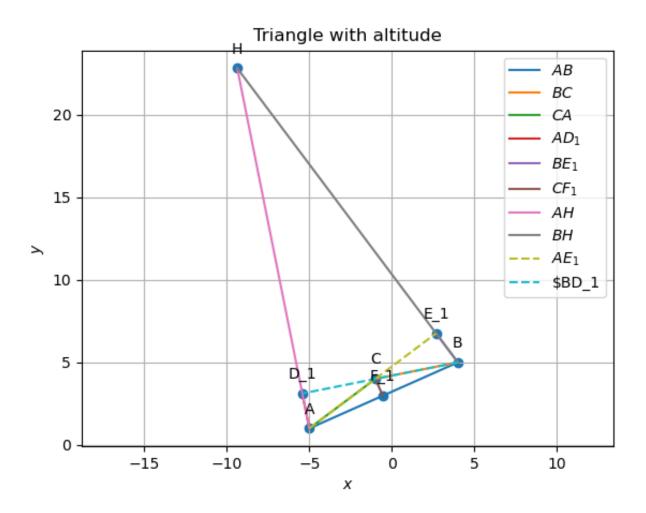


Fig. 0. Triangle

parameter	value	description	
\mathbf{n}_{7}^{T}	$\begin{pmatrix} -5 & -1 \end{pmatrix}$	$\mathrm{A}D_1$	
c_7	-9	AD_1	
$\mathbf{n}_{8}^{ op}$	$\begin{pmatrix} -4 & -3 \end{pmatrix}$	$\mathrm{B}E_1$	
<i>c</i> ₈	9	$\mathbf{B}\mathbf{E}_1$	
$\mathbf{n}_{9}^{ op}$	(9 4)	CF_1	
<i>c</i> ₉	0	Cr 1	
Н	$\begin{pmatrix} -9.36 \\ 22.81 \end{pmatrix}$	orthocentre of triangle	
TABLE 0			

TRIANGLE WITH ORTHOCENTER

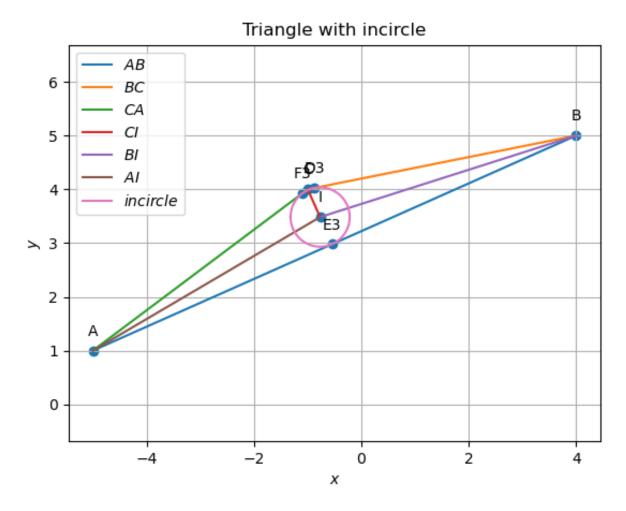


Fig. 0. Triangle

parameter	value	description		
$\mathbf{n}_{10}^{ op}$	(9 4)	Perpendicular bisector of AB		
c_{10}	22	respendicular discetor of AB		
\mathbf{n}_{11}^{T}	$\begin{pmatrix} -5 & -1 \end{pmatrix}$	Perpendicular bisector of BC		
c_{11}	-16.5	respondicular discetor of Be		
$\mathbf{n}_{12}^{ op}$	$\begin{pmatrix} -4 & -3 \end{pmatrix}$	Perpendicular bisector of CA		
c_{12}	-5.5	respondicular disector of CA		
О	(3.681)			
	(-6.409)	Circumcircle		
radius	4.65			
TABLE 0				

Triangle with circumcircle

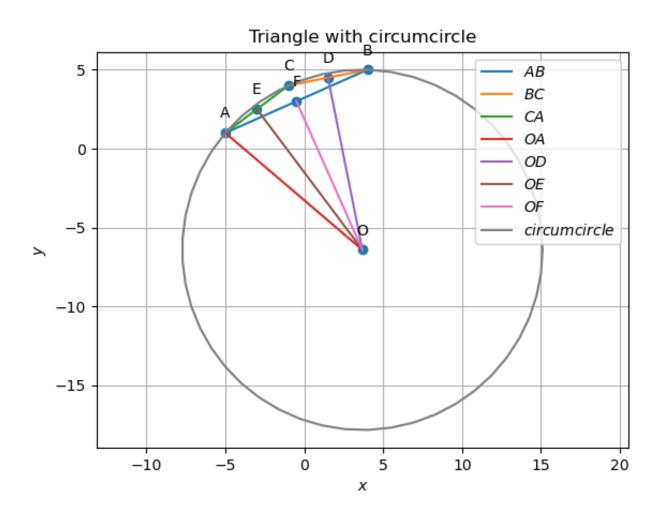


Fig. 0. Triangle