Sample LaTeXDocument with a Figure

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Consider a triangle with vertices,

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

I. Vectors

Parameter	Value	Description
$\mathbf{m_{AB}}$	$\begin{pmatrix} -7 \\ 5 \end{pmatrix}$	Direction vec of AB
$\mathbf{m_{BC}}$	$\begin{pmatrix} 5 \\ 3 \end{pmatrix}$	Direction vec of BC
$\mathbf{m_{CA}}$	$\begin{pmatrix} 2 \\ -8 \end{pmatrix}$	Direction vec of CA
$\|\|\mathbf{A}-\mathbf{B}\|\|$	5.831	Lenght of AB
$\|\|\mathbf{B}-\mathbf{C}\|\|$	5.831	Lenght of BC
$\|\|\mathbf{C}-\mathbf{A}\|\|$	5.831	Lenght of CA
rank $\begin{pmatrix} 1 & 1 & 1 \\ A & B & C \end{pmatrix}$	3	non-collinear
$\mathbf{n_{AB}}$	$\begin{pmatrix} 5 \\ 7 \end{pmatrix}$	AB
$\mathbf{c_{AB}}$	-13	
$\mathbf{n_{BC}}$	$\begin{pmatrix} 3 \\ -5 \end{pmatrix}$	BC
$\mathbf{c_{BC}}$	-17	
$\mathbf{n_{CA}}$	$\begin{pmatrix} -8 \\ -2 \end{pmatrix}$	CA
$\mathbf{c_{CA}}$	-16	
Area	23	Area of $\triangle ABC$
cos(A)	0.761	cosine of $\angle A$
cos(B)	0.398	cosine of $\angle B$
cos(C)	0.291	cosine of $\angle C$

TABLE I.1
Vectors

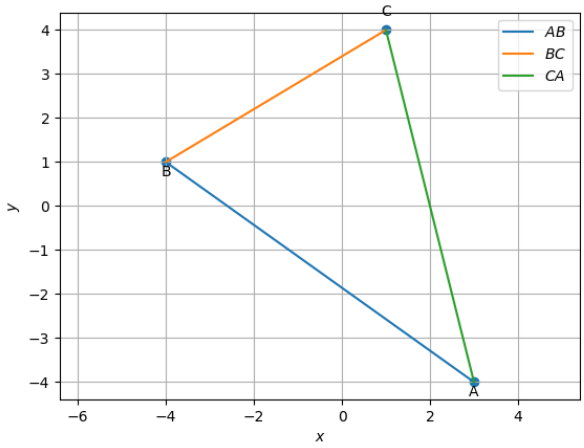

Fig. I.1. Triangle generated using python

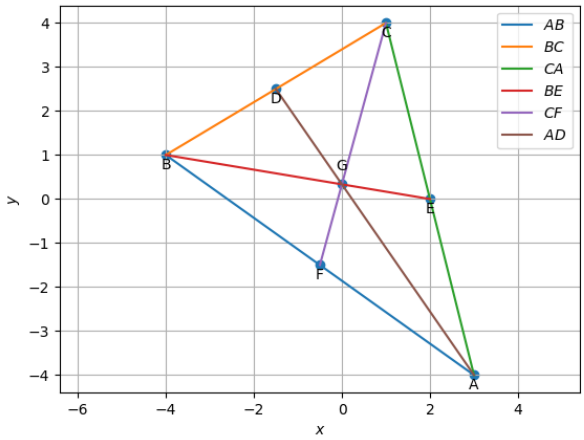

Fig. II.2. Medians generated using python

II. Median

Parameter	Value	Description
D	$\begin{pmatrix}-1.5\\2.5\end{pmatrix}$	Midpoint AB
E	$\begin{pmatrix}2\\0\end{pmatrix}$	Midpoint BC
F	$\begin{pmatrix}0.5\\-1.5\end{pmatrix}$	Midpoint CA
$\mathbf{n_{AD}}$	$\begin{pmatrix}6.5\\4.5\end{pmatrix}$	AD
$\mathbf{c_{AD}}$	1.5	
$\mathbf{n_{BE}}$	$\begin{pmatrix}-1\\-6\end{pmatrix}$	BE
$\mathbf{c_{BE}}$	-2	
$\mathbf{n_{CF}}$	$\begin{pmatrix}-5.5\\1.5\end{pmatrix}$	CF
$\mathbf{c_{CF}}$	0.5	
G	$\begin{pmatrix}-0\\0.333\end{pmatrix}$	Centroid
$\frac{BG}{GE}$	2	Ratio of BG and GE
$\frac{CG}{GF}$		Ratio of CG and GF
$\frac{CG}{GF}$		Ratio of CG and GF
rank $\begin{pmatrix}1 & 1 & 1\\A & D & G\end{pmatrix}$	2	**A**, **D**, **G** collinear
A − **F**	$\begin{pmatrix}3.5\\-2.5\end{pmatrix}$	Direction vec of AF
E − **D**		Direction vec of ED

TABLE II.2
CENTROID

III. ALTITUDE

Parameter	Value	Description
$\mathbf{D_1}$	$\begin{pmatrix}-1.059\\2.764\end{pmatrix}$	altitude foot from A
$\mathbf{E_1}$	$\begin{pmatrix}1.412\\2.353\end{pmatrix}$	altitude foot from B
$\mathbf{F_1}$	$\begin{pmatrix}-2.108\\-0.351\end{pmatrix}$	altitude foot from C
$\mathbf{n_{AD_1}}$	$\begin{pmatrix}5\\3\end{pmatrix}$	AD_1
$\mathbf{c_{AD_1}}$	3	
$\mathbf{n_{BE_1}}$	$\begin{pmatrix}2\\-8\end{pmatrix}$	BE_1
$\mathbf{c_{BE_1}}$	-16	
$\mathbf{n_{CF_1}}$	$\begin{pmatrix}-7\\5\end{pmatrix}$	CF_1
$\mathbf{c_{CF_1}}$	13	
H	$\begin{pmatrix}-0.522\\1.870\end{pmatrix}$	Orthocenter

TABLE III.3
ORTHOCENTER

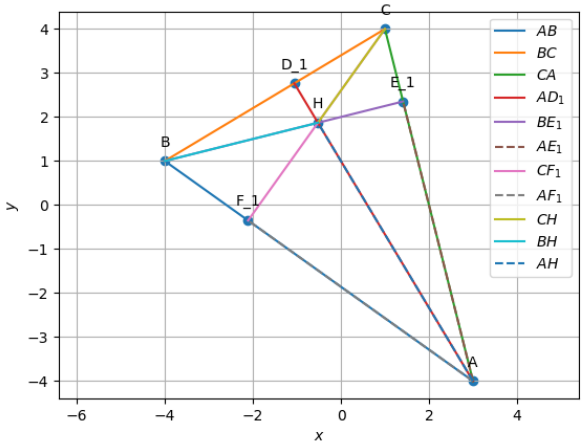

Fig. III.3. Altitudes generated using python

IV. PERPENDICULAR BISECTOR

$\mathbf{n_{OA}}$	$\begin{pmatrix}-3.56\\-2.74\end{pmatrix}$	Direction vec of OA
$\mathbf{n_{OB}}$	$\begin{pmatrix}1.43\\4.26\end{pmatrix}$	Direction vec of OB
$\mathbf{n_{OC}}$	$\begin{pmatrix}4.43\\-0.74\end{pmatrix}$	Direction vec of OC
O	$\begin{pmatrix}0.261\\-0.435\end{pmatrix}$	Circumcenter
$\mathbf{n_{OD}}$	$\begin{pmatrix}7\\-5\end{pmatrix}$	OD
$\mathbf{c_{OD}}$	4	
$\mathbf{n_{OE}}$	$\begin{pmatrix}-5\\-3\end{pmatrix}$	OE
$\mathbf{c_{OE}}$	0	
$\mathbf{n_{OF}}$	$\begin{pmatrix}-2\\8\end{pmatrix}$	OF
$\mathbf{c_{OF}}$	-4	
$\lvert\mathbf{A}-\mathbf{O}\rvert$	4.496	Norm of OA
$\lvert\mathbf{B}-\mathbf{O}\rvert$		Norm of OB
$\lvert\mathbf{C}-\mathbf{O}\rvert$		Norm of OC
R		Circumradius
$\angle BAC$	40.42°	Angle $\angle BAC$
$\angle BOC$	80.85°	Angle $\angle BOC$

TABLE IV.4
CIRCUMCENTER

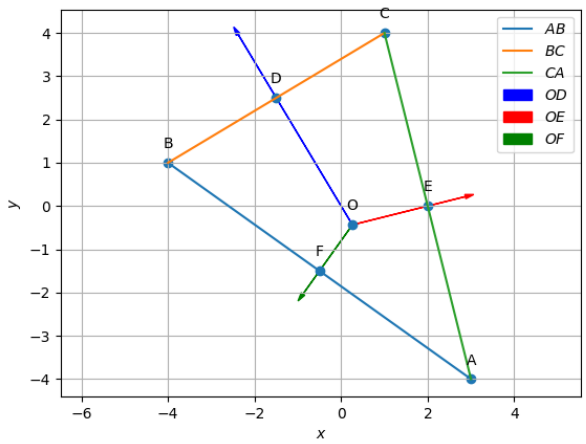

Fig. IV.4. Perpendicular bisectors generated using python

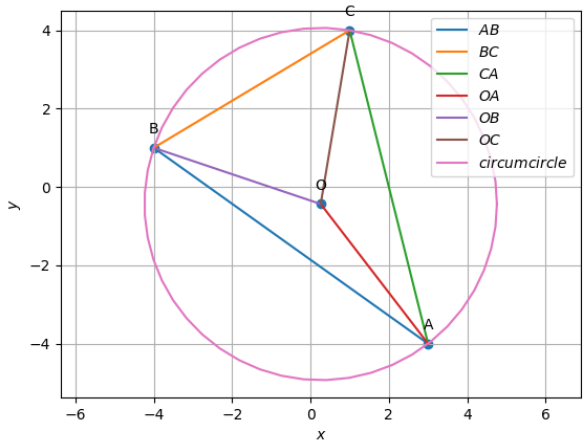

Fig. IV.4. Circumcircle generated using python

V. Angular bisector

$\mathbf{n_{IA}}$	$\begin{pmatrix}1.551\\1.056\end{pmatrix}$	IA
$\mathbf{c_{IA}}$	0.429	
$\mathbf{n_{IB}}$	$\begin{pmatrix}0.066\\1.671\end{pmatrix}$	IB
$\mathbf{c_{IB}}$	1.404	
$\mathbf{n_{IC}}$	$\begin{pmatrix}1.484\\-0.615\end{pmatrix}$	IC
$\mathbf{c_{IC}}$	-0.975	
$\mathbf{I}$	$\begin{pmatrix}-0.30\\0.85\end{pmatrix}$	Incenter
$\mathbf{D_3}$	$\begin{pmatrix}-1.35\\2.59\end{pmatrix}$	POC with AB
$\mathbf{E_3}$	$\begin{pmatrix}1.66\\1.34\end{pmatrix}$	POC with BC
$\mathbf{F_3}$	$\begin{pmatrix}-1.48\\-0.80\end{pmatrix}$	POC with CA
$\lvert\mathbf{D_3}-\mathbf{O}\rvert$	2.03	Norm of OD_3
$\lvert\mathbf{E_3}-\mathbf{O}\rvert$		Norm of OE_3
$\lvert\mathbf{F_3}-\mathbf{O}\rvert$		Norm of OF_3
$\mathbf{r}$		Inradius
$\angle BAI$	20.21°	Angle $\angle BAI$
$\angle CAI$		Angle $\angle CAI$

TABLE V.5
Incircle

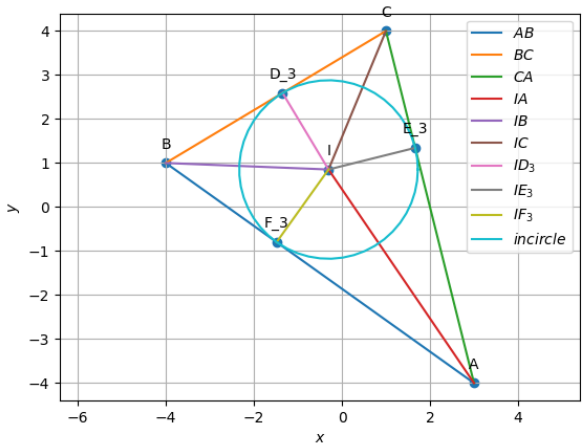

Fig. V.5. Incircle generated using python