Random Vector Assignment

Ajay

Consider a triangle with vertices,
$\mathbf{A} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$, $\mathbf{B} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$, $\mathbf{C} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

I. Vector

A. Table

Parameter	Value	Description
A	(2,-1)	Coordinate
B	(-1,4)	Coordinate
c	(1,2)	Coordinate
Length of side	7.07	AB
Length of side	4.47	BC
Length of side	3.16	CA
$n^\top$	(5,5)	AB
c	5	
$n^\top$	(-2,-4)	BC
c	-10	
$n^\top$	(-3,-1)	CA
c	-5	
Area	5	ABC
Angle	26.57	A
Angle	18.43	B
Angle	135	C

TABLE I.1
Equations related to triangle

B. Figure

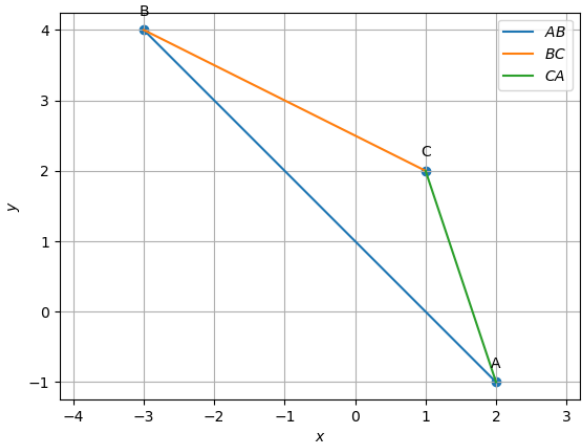

Fig. I.1. Triangle generated using python

II. Median

A. Table

Parameter	Value	Description
Coordinates	(-1,3)	D (mid point of AB)
Coordinates	(1.5,0.5)	E (mid point of BC)
Coordinates	(-0.5,1.5)	F (mid point of CA)
$n^\top$	(4,3)	AD
c	5	
$n^\top$	(-3.5,-4.5)	BE
c	-7.5	
$n^\top$	(-0.5,1.5)	CF
c	2.5	
Centroid(G)	(0,1.66)	Point of intersection of BE and CF

TABLE II.1
Equations related to median

B. Figure

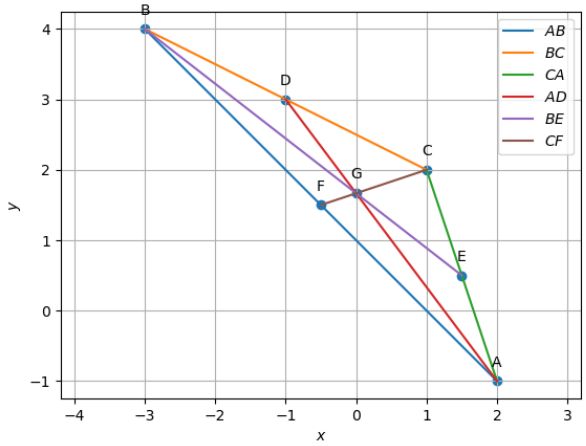

Fig. II.1. Triangle with centroid generated using python

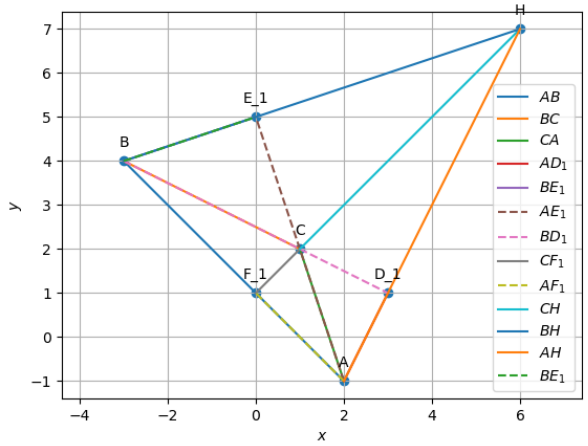

Fig. III.1. Triangle with altitude generated using python

III. Altitude

A. Table

Parameter	Value	Description
n	(-4,2)	Normal Vector of AD1
$n^\top$	(4,-2)	AD1
c	10	
$n^\top$	(1,-3)	BE1
c	-15	
$n^\top$	(-5,5)	CF1
c	5	
Orthocentre(H)	(6,7)	Intersection of BE1 and CF1

TABLE III.1
Equations related to altitude

B. Figure

IV. Perpendicular Bisector

A. Table

Parameter	Value	Description
$n^\top$	(5,-5)	OF (Perpendicular Bisector of AB)
c	-10	
$n^\top$	(-4,2)	OD (Perpendicular Bisector of BC)
c	10	
$n^\top$	(-1,3)	OE (Perpendicular Bisector of CA)
c	0	
Circumcentre (O)	(-3,-1)	Point of intersection of OE and OF
Radius	5	Radius of circumcircle
Angle	306.87	BOC
Angle	26.56	BAC

TABLE IV.1
Equations related to circumcircle

B. Figure

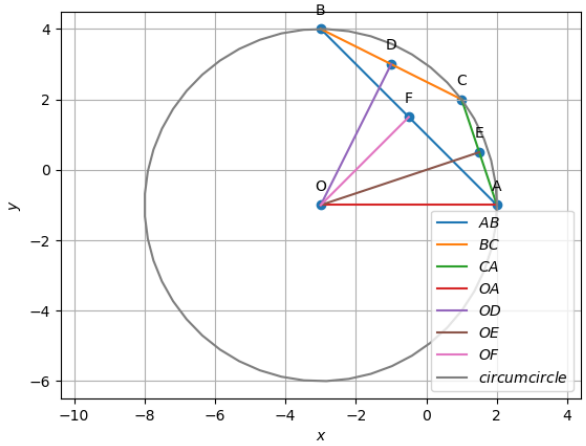

Fig. IV.1. Triangle with circumcircle generated using python

V. Angular Bisector

A. Table

Parameter	Value	Description
$n^\top$	(1.66,1.02)	AI (Angle bisector of A)
c	2.29	
$n^\top$	(-1.15,-1.60)	BI (Angle Bisector of angle B)
c	-2.94	
$n^\top$	(-0.50,0.58)	CI (Angle bisector of angle C)
c	-1.58	
Incentre (I)	(0.44,1.52)	Point of intersection of BI and CI
Distance	-0.68	I from BC
Distance	-0.68	I from AB
Distance	-0.68	I from AC
Inradius	0.68	Radius of Incircle
D3	(0.75,2.13)	Point of contact of incircle with BC
E3	(-0.03,1.03)	Point of contact of incircle with AB
F3	(1.09,1.73)	Point of contact of incircle with AC
m	2.88	Length of AE3
n	4.19	Length of BD3
p	0.28	Length of CD3

TABLE V.1
Equations related to incircle

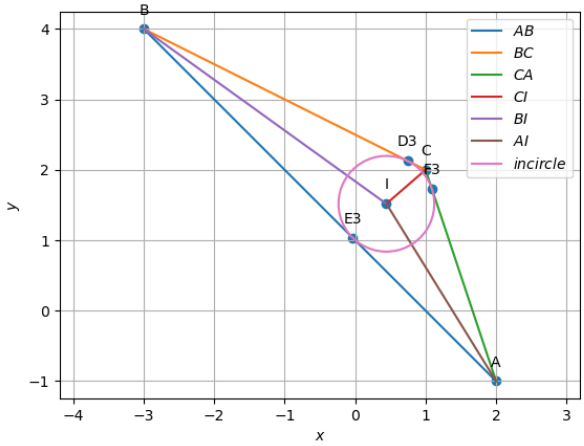

Fig. V.1. Triangle with incircle generated using python

B. Figure