

Comparison

Barycentric Coordinates

vs

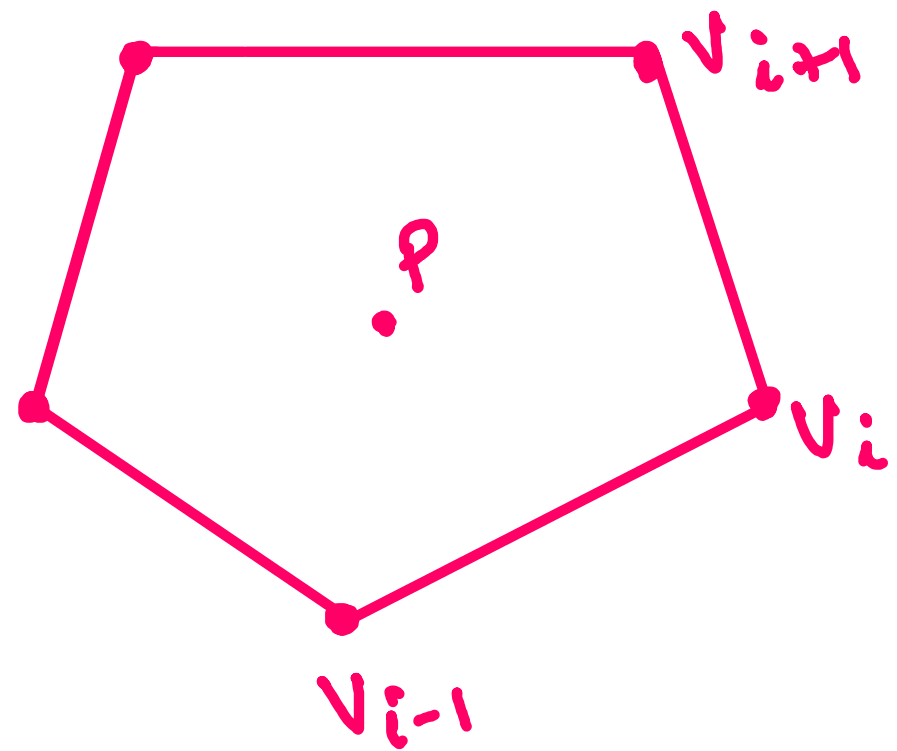
Generalized Barycentric Coordinates (Wachspress Coordinates)

vs

Generalized Mean Value Coordinates

There is a polygon
consisting of points
 V_1, V_2, \dots, V_n

Point P is inside polygon



Generalized Mean Value Coordinates

$$\vec{d}_i = \vec{v}_i - \vec{x}$$

$$r_i = |\vec{v}_i - \vec{x}|$$

$$i=1, 2, \dots, n$$

Generalized MV coordinate is

$$\phi_i(p) = \frac{\hat{w}_i(p)}{\sum_{j=1}^n \hat{w}_j(p)}$$

where

$$\hat{w}_j(p) = \left(r_{i-1} r_{i+1} - \vec{d}_{i-1} \cdot \vec{d}_{i+1} \right)^{1/2} \prod_{j \neq i-1, i} \left[r_j r_{j+1} + \vec{d}_j \cdot \vec{d}_{j+1} \right]^{1/2}$$

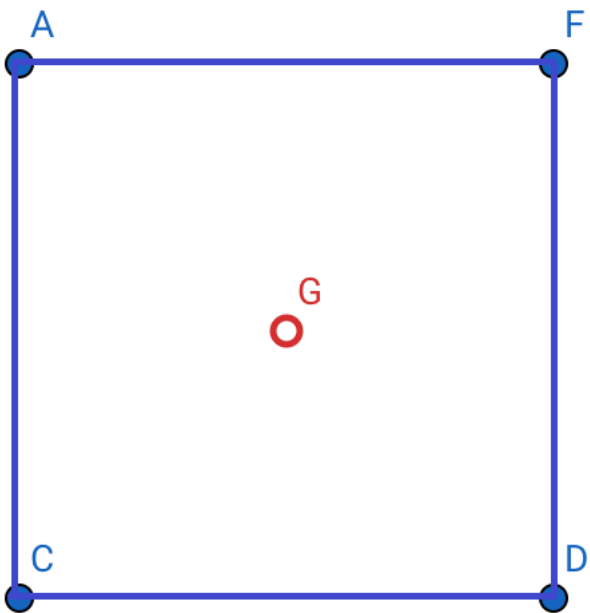
Wachspress Coordinate or Generalized Barycentric Coordinates

Generalized Barycentric coordinate given by Wachspress are

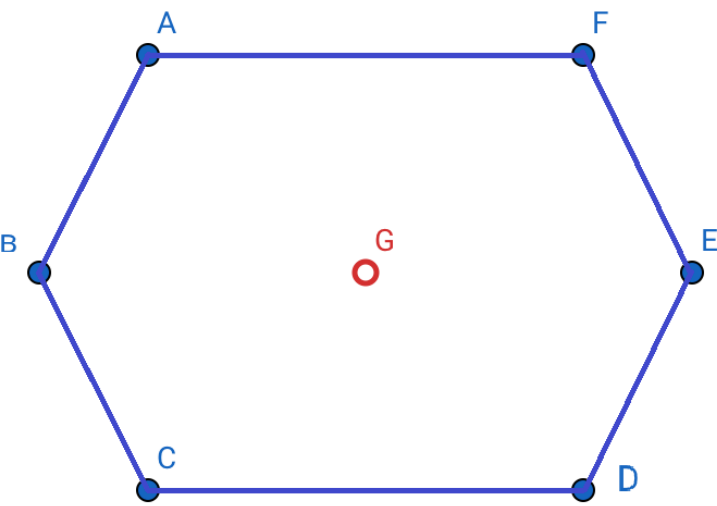
$$\phi_i = \frac{w_i}{\sum_{j=1}^n w_j}$$

where

$$w_i = A(v_{i-1}, v_i, v_{i+1}) \prod_{j \neq i-1, i} A(p, v_j, v_{j+1})$$

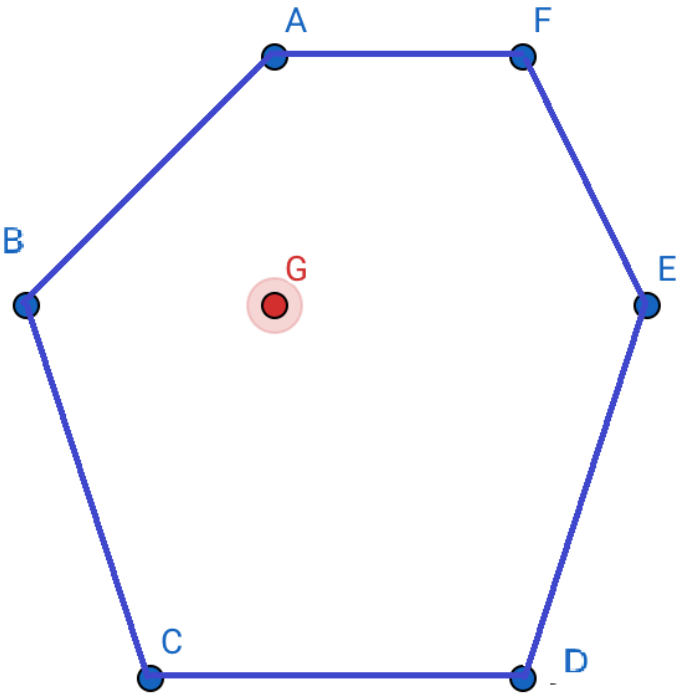


	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	25	25	25
C	25	25	25
D	25	25	25
F	25	25	25
Total	100	100	100



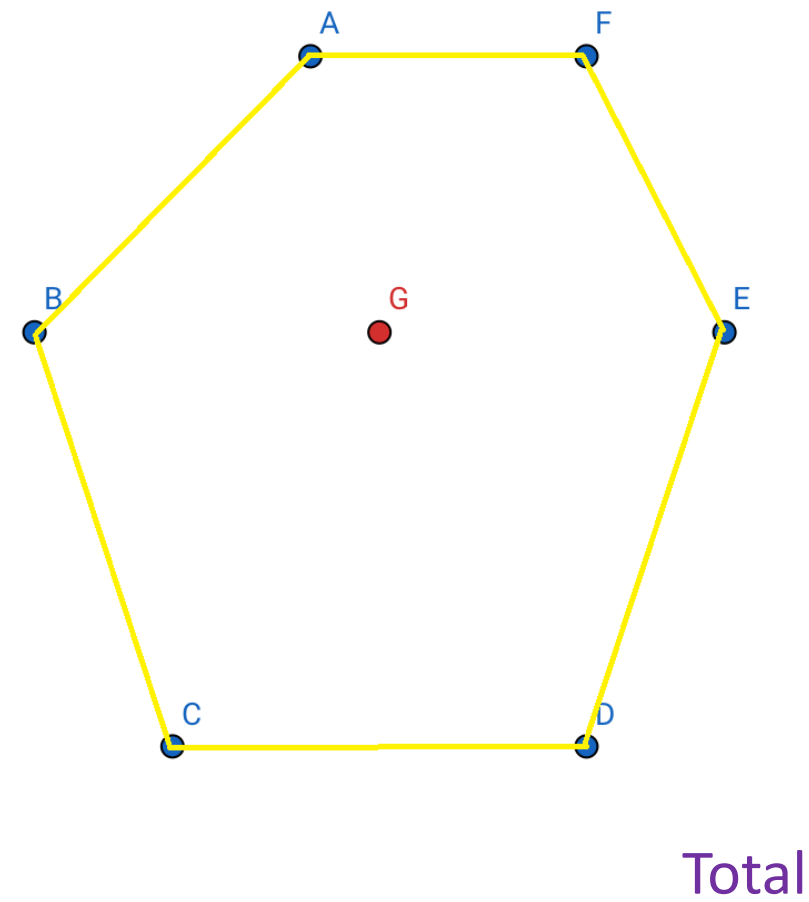
Total

	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	19.5903	18.75	18.75
B	10.8194	12.5	12.5
C	19.5903	18.75	18.75
D	19.5903	18.75	18.75
E	10.8194	12.5	12.5
F	19.5903	18.75	18.75
	100	100	100

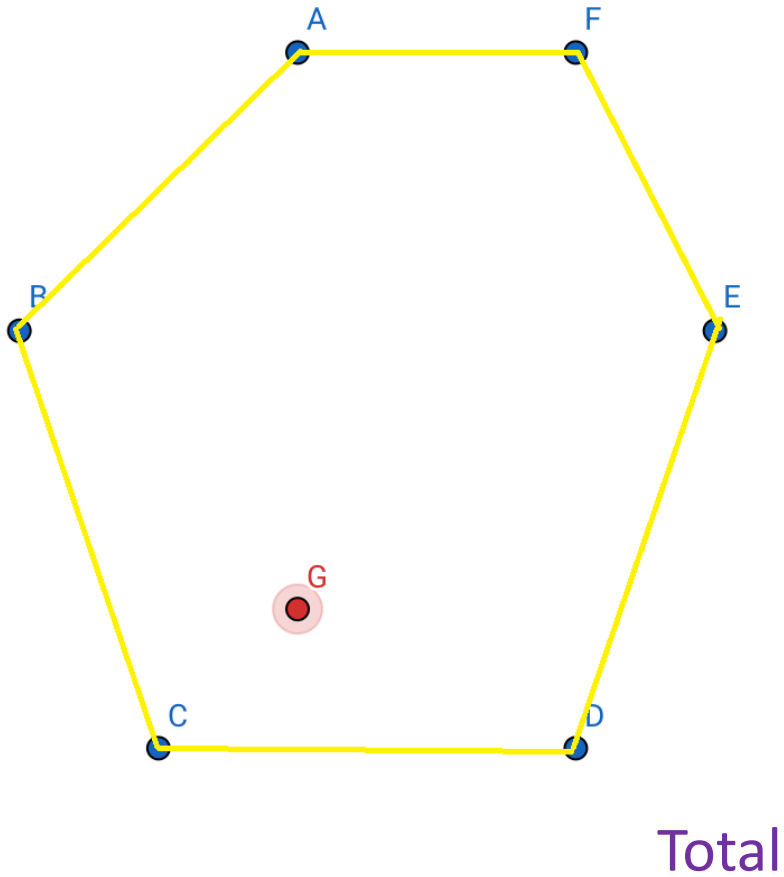


Total

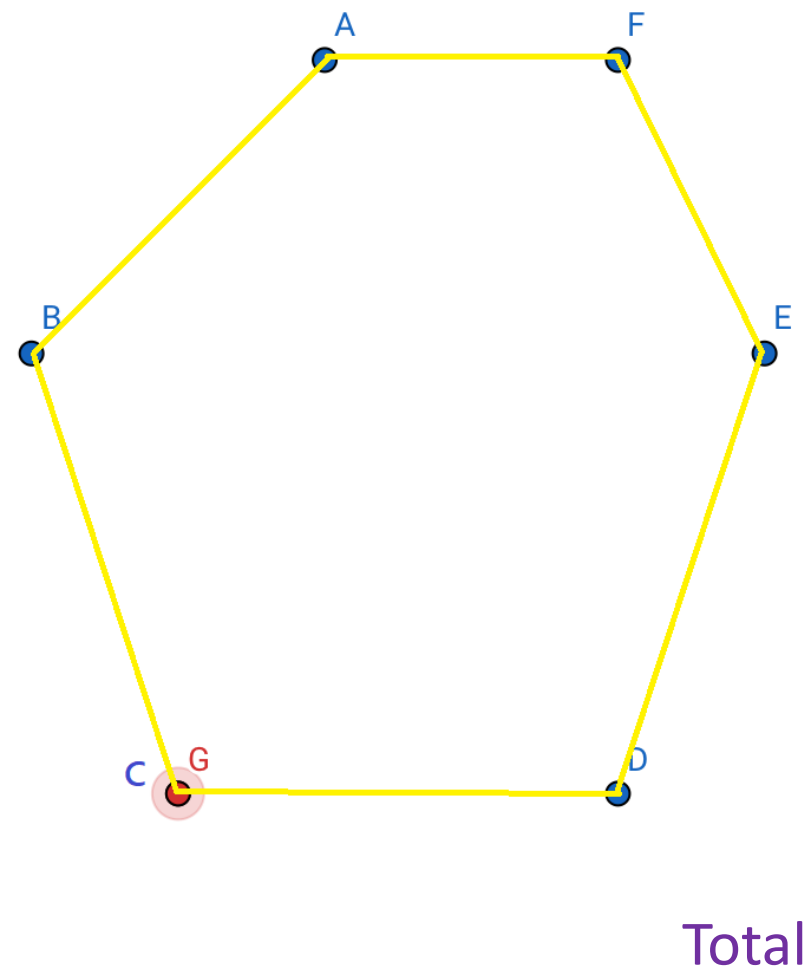
	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	2	24.8674	22.314	22.314
B	2	30.2576	29.7521	29.7521
C	3.162	13.4547	14.876	14.876
D	3.61	9.99049	9.91736	9.91736
E	3	11.1294	8.26446	8.26446
F	2.83	10.3004	14.876	14.876
		100	100	100



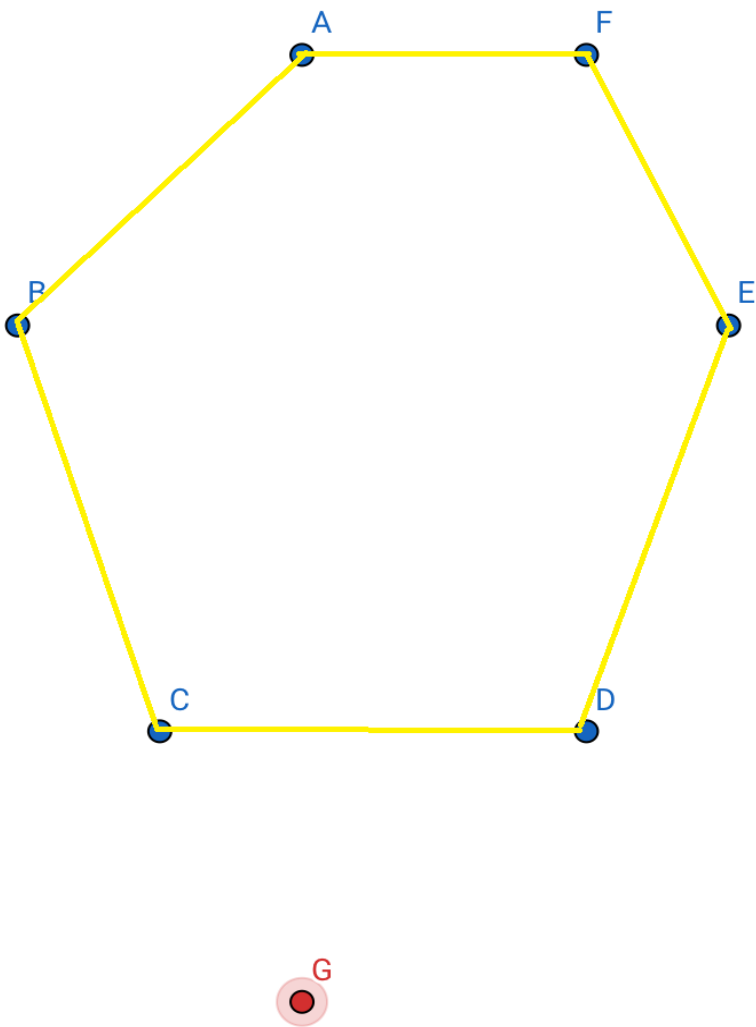
	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	2.06	22.8028	19.7368	19.7368
B	2.5	20.9293	21.0526	21.0526
C	3.35	12.4685	13.1579	13.1579
D	3.35	12.4685	13.1579	13.1579
E	2.5	16.7282	13.1579	13.1579
F	2.5	14.6027	19.7368	19.7368
Total		100	100	100



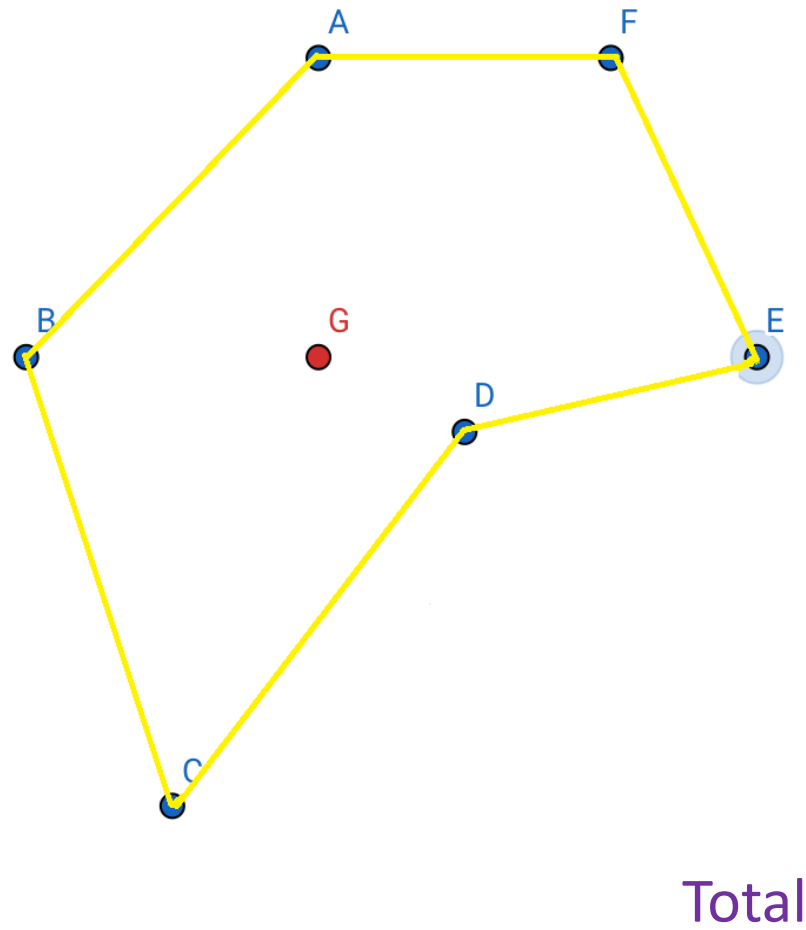
	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	4	4.54423	3.80435	3.80435
B	2.83	13.9762	15.2174	15.2174
C	1.41	47.1882	45.6522	45.6522
D	2.24	24.5982	26.087	26.087
E	3.61	6.55782	5.43478	5.43478
F	4.47	3.13537	3.80435	3.80435
Total		100	100	100



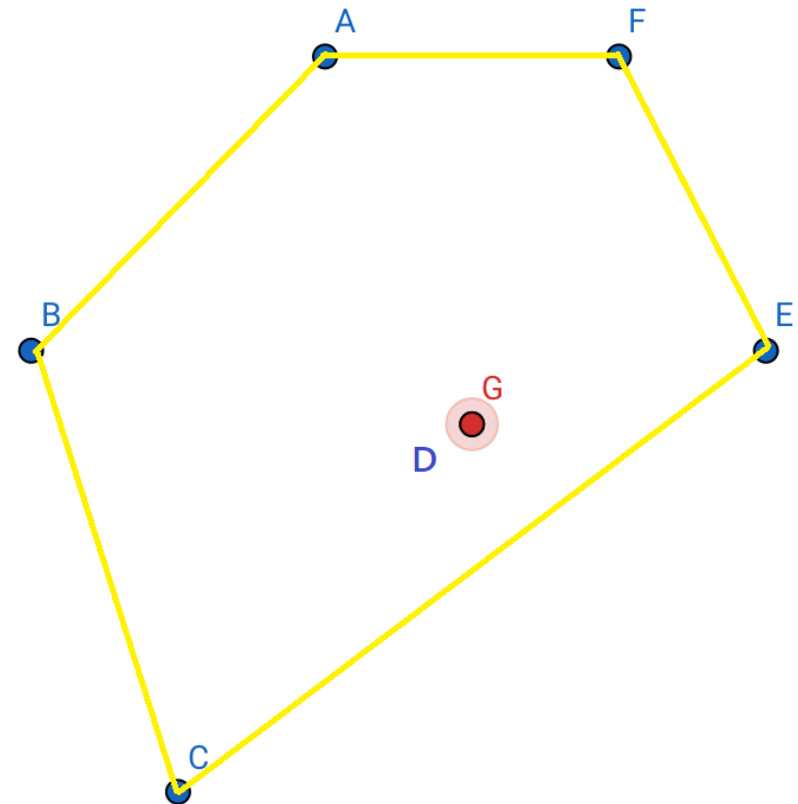
	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	5.1	0	0	0
B	3.16	0	nan	0
C	0	100	nan	100
D	3	0	nan	0
E	5	0	0	0
F	5.83	0	0	0
Total		100	nan	100



	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	7	7.80453	-1.83715	-1.83715
B	5.4	7.14199	-51.4402	-51.4402
C	2.24	43.9403	131.568	131.568
D	2.83	29.3725	38.778	38.778
E	5.83	5.60733	-14.7306	-14.7306
F	7.3	6.13335	-2.33819	-2.33819
Total		100	100	100

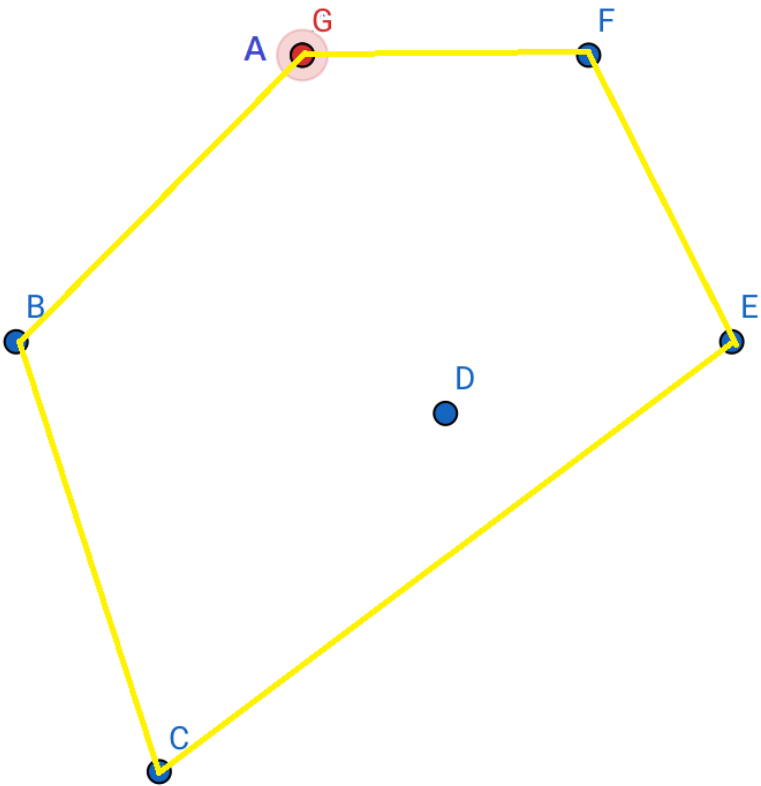


	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	2	19.828	28	28
B	2	24.1259	37.3333	37.3333
C	3.16	14.0818	45.3333	45.3333
D	1.12	27.6731	-85.3333	-85.3333
E	3	6.07818	56	56
F	2.83	8.21302	18.6667	18.6667
Total		100	100	100

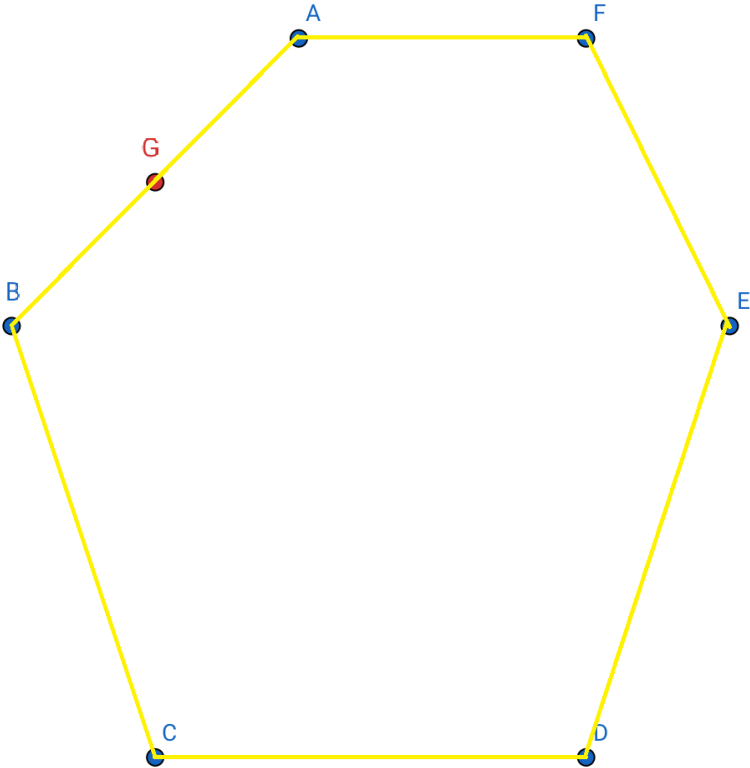


Total

	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	2.69	0	nan	0
B	3.04	0	nan	0
C	3.2	0	nan	0
D	0	100	nan	100
E	2.06	0	nan	0
F	2.69	0	nan	0
		100	nan	100



	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	0	100	nan	100
B	2.83	0	nan	0
C	5.1	0	0	0
D	2.69	0	0	0
E	3.6	0	0	0
F	2	0	nan	0
Total		100	nan	100



	Distance from G	Generalized MV Coordinates	Barycentric Coordinates	Generalized Barycentric Coordinates
A	1.41421	50	nan	50
B	1.41421	50	nan	50
C	4	$1.39\text{E-}07 \equiv 0$	0	0
D	5	$1.03\text{E-}07 \equiv 0$	0	0
E	4.12311	$1.17\text{E-}07 \equiv 0$	0	0
F	3.16228	$1.24\text{E-}07 \equiv 0$	nan	0
Total		100	nan	100