1 - Com base nos dados disponibilizados e nas informações da figura abaixo, faça o que se pede abaixo:

a) Oriente o terreno levantado

b) Indique a direção do Norte e predominante do vento, sabendo que o vento predominante da região é correspondente 45°30' SE e sopra na direção SE para NW.

c) Calcule as coordenadas do marco M2 e dos vértices da poligonal do terreno (P1, P2, P3 e P4).

d) Comprimento dos lados 1-2, 2-3, 3-4 e 4-1

e) Calcule a área do terreno em m^2, km^2 e hectares (ha).

DADOS:

Coordenadas dos Marcos
X_{M1}=292.356,623m
Y_{M1}=9.112.830,016m

X_{M2}=292.355,089m
Y_{M2}=9.112.810,238m

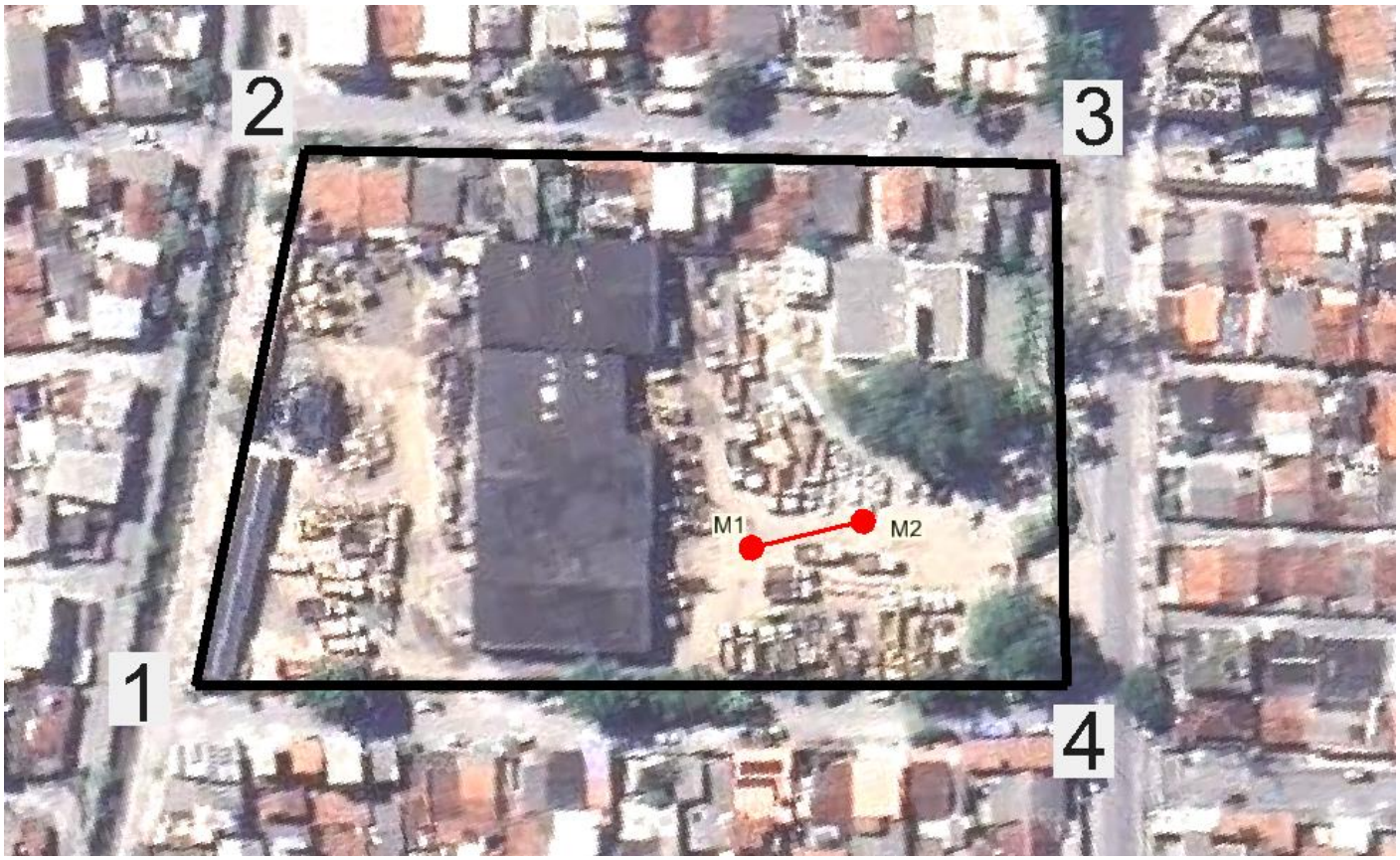
Leituras da Estação total (Coordenadas Polares)

DH $_{M1_1}$ = 98,68m
AH $_{M1_1}$ = 179°26'58"

DH $_{M1_2}$ = 102,95m
AH $_{M1_2}$ = 235°2'59"

DH $_{M1_3}$ = 84,52m
AH $_{M1_3}$ = 321°43'50"

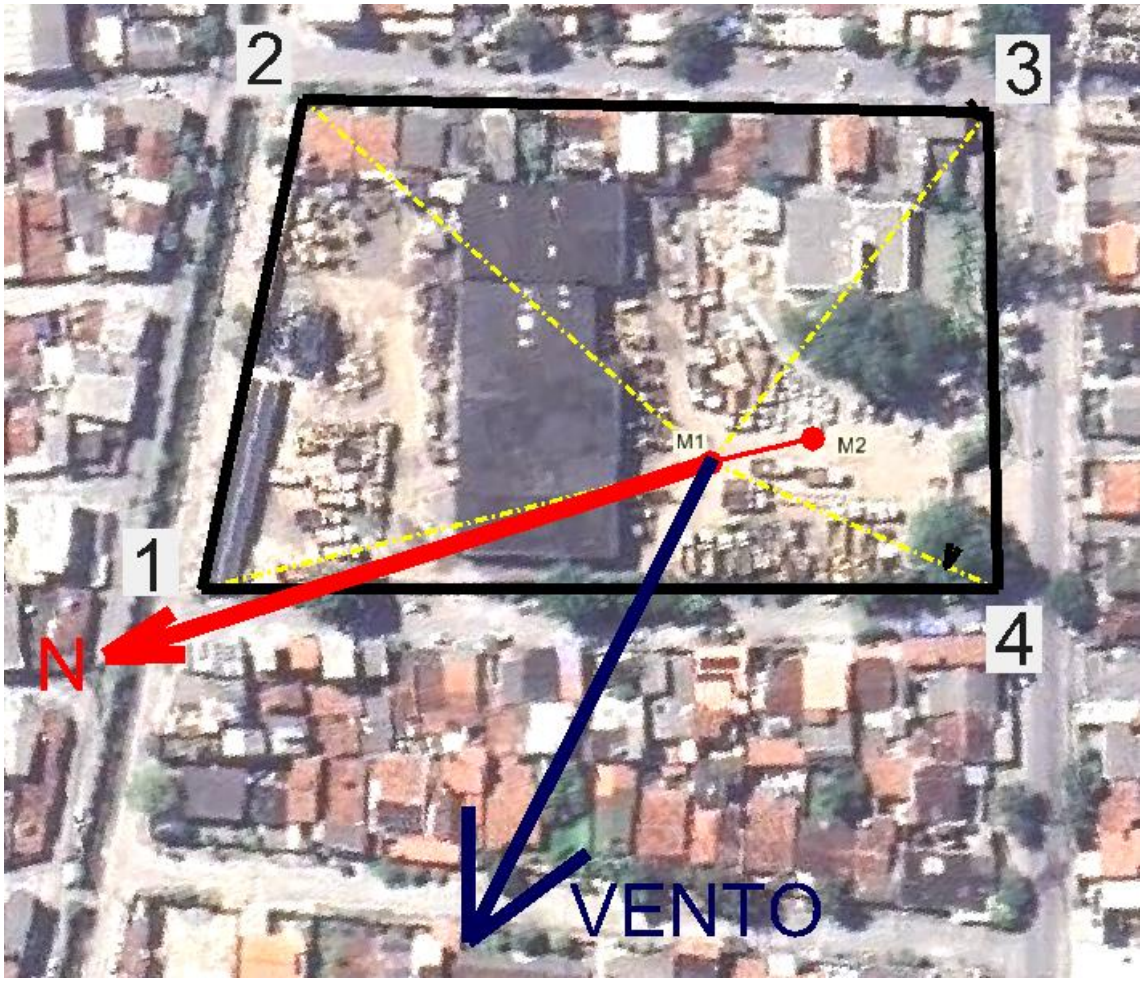
DH $_{M1_4}$ = 59,30m
AH $_{M1_4}$ = 36°53'7"



EXERCÍCIO 01 - ORIENTAÇÃO E COORDENADAS

a) Oriente o terreno levantado

b) Indique a direção do Norte e predominante do vento, sabendo que o vento predominante da região é correspondente 45°30' SE e sopra na direção SE para NW.



a) e b)

$$R_{m_1,m_2} = \operatorname{arctg}\left(\frac{X_{m_2} - X_{m_1}}{Y_{m_1} - Y_{m_1}}\right)$$

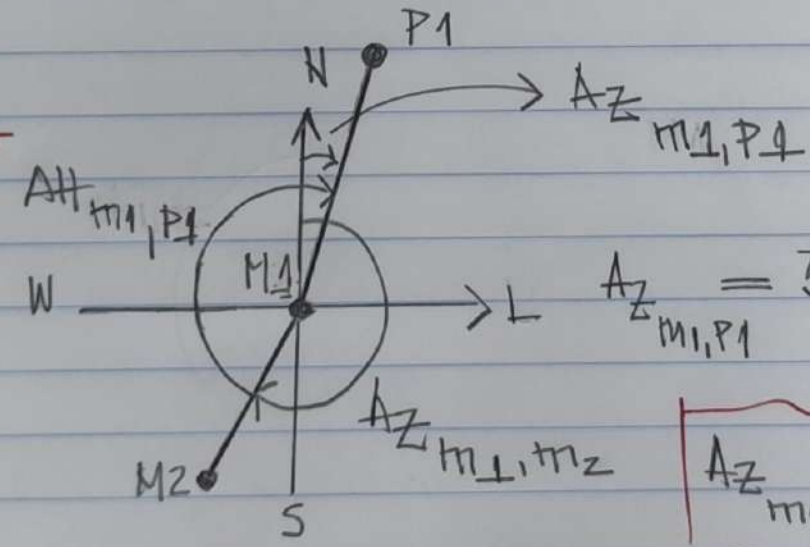
$$R_{m_1,m_2} = \operatorname{arctg}\left(\frac{355,089 - 356,623}{810,238 - 830,016}\right) \frac{(-)}{(-)}$$

$R_{m_1,m_2} = 4°26'06''\,SW \rightarrow 3º\,QD$ ↯ 3º QD

$$Az_{m_1,m_2} = 180° + R_{m_1,m_2}$$

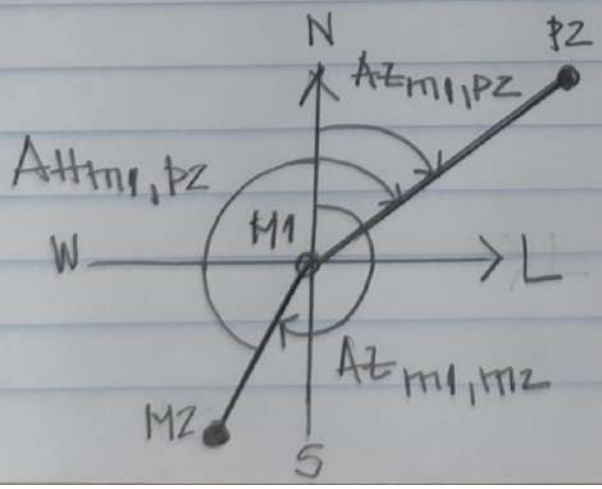
$$Az_{m_1,m_2} = 184°26'06''$$

c)



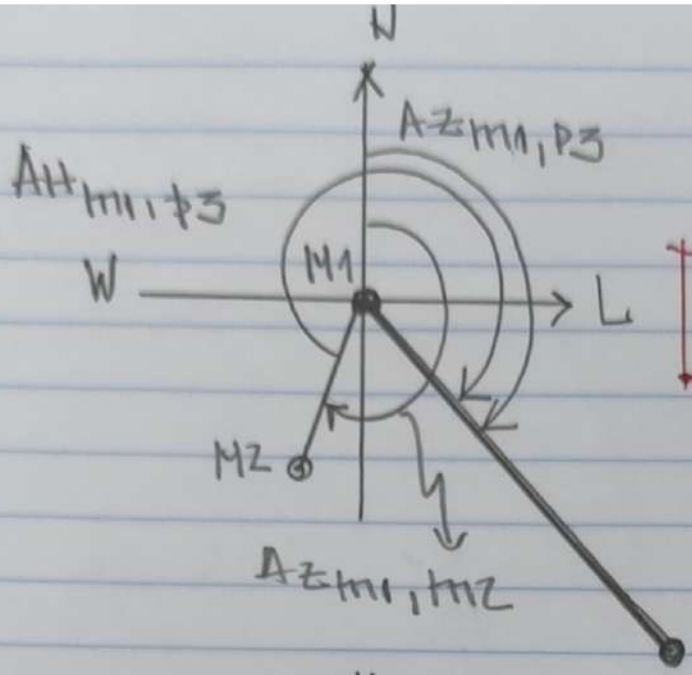
$$Az_{m_1,P_1} = 360° - (Az_{m_1,m_2} + AH_{m_1,P_1})$$

$$Az_{m_1,P_1} = 3°53'04''$$



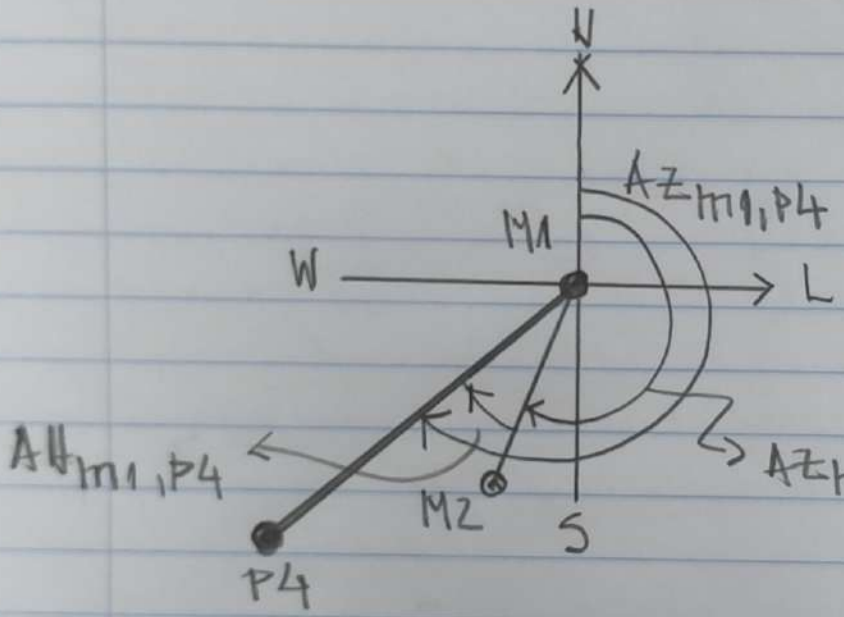
$$Az_{m_1,P_2} = 360° - (Az_{m_1,m_2} + AH_{m_1,P_2})$$

$$Az_{m_1,P_2} = 59°29'05''$$



$Az_{m1,P3} = Az_{m1,m2} - (360° - AH_{m1,P3})$

$Az_{m1,P3} = 145°59'28''$



$Az_{m1,P4} = Az_{m1,m2} + AH_{m1,P4}$

$Az_{m1,P4} = 221°19'13''$

P1 $\begin{cases} X_{P1} = 292.356,623 + 98,68 \cdot \text{sen } 3°53'04'' \\ Y_{P1} = 9.112.830,016 + 98,68 \cdot \cos 3°53'04'' \end{cases}$ $\begin{cases} X_{P1} = 292.363,308\ m \\ Y_{P1} = 9.112.928,469\ m \end{cases}$

P2 $\begin{cases} X_{P2} = 292.356,623 + 102,95 \cdot \text{sen } 59°29'05'' \\ Y_{P2} = 9.112.830,016 + 102,95 \cdot \cos 59°29'05'' \end{cases}$ $\begin{cases} X_{P2} = 292.445,314\ m \\ Y_{P2} = 9.112.882,291\ m \end{cases}$

P3 $\begin{cases} X_{P3} = 292.356,623 + 84,52 \cdot \text{sen } 145°59'28'' \\ Y_{P3} = 9.112.830,016 + 84,52 \cdot \cos 145°59'28'' \end{cases}$ $\begin{cases} X_{P3} = 292.403,897\ m \\ Y_{P3} = 9.112.759,953\ m \end{cases}$

P4 $\begin{cases} X_{P4} = 292.356,623 + 59,30 \cdot \text{sen } 221°19'13'' \\ Y_{P4} = 9.112.830,016 + 59,30 \cdot \cos 221°19'13'' \end{cases}$ $\begin{cases} X_{P4} = 292.317,469\ m \\ Y_{P4} = 9.112.785,480\ m \end{cases}$

d) Comprimentos dos lados

$$d_{P1,P2} = \sqrt{(x_{P2} - x_{P1})^2 + (y_{P2} - y_{P1})^2} \therefore \boxed{d_{P1,P2} = 94,114\,m}$$

$$d_{P2,P3} = \sqrt{(x_{P2} - x_{P3})^2 + (y_{P2} - y_{P3})^2} \therefore \boxed{d_{P2,P3} = 129,158\,m}$$

$$d_{P3,P4} = \sqrt{(x_{P3} - x_{P4})^2 + (y_{P3} - y_{P4})^2} \therefore \boxed{d_{P3,P4} = 90,119\,m}$$

$$d_{P4,P1} = \sqrt{(x_{P4} - x_{P1})^2 + (y_{P4} - y_{P1})^2} \therefore \boxed{d_{P4,P1} = 150,157\,m}$$

e) Cálculo da área

	292.363,308	9.112.928,469
413.460,181 ←	292.445,314	9.112.882,291 → 320543,296
356.354,449 ←	292.403,897	9.112.759,953 → 338417,582
241.261,647 ←	292.317,469	9.112.785,480 → 317252,857
285.371,144 ←	292.363,308	9.112.928,469 → 294766,348

$\Sigma_1 = 1.296.447,421$ $\quad$ $\Sigma_2 = 1.270.974,084$

$$A_{REA} = \left| \frac{\Sigma_1 - \Sigma_2}{2} \right| \therefore \boxed{A_{REA} = 12736,67\,m^2}$$

$A_{REA} = 1,27\,ha = 0,0127\,Km^2$