



FAKULTET TEHNIČKIH NAUKA
DEPARTMAN ZA GRAĐEVINARSTVO I GEODEZIJU
LABORATORIJA ZA GEODEZIJU



INŽENJERSKA GEODEZIJA

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Vežba 1

- Uputstvo
 - Zadatak uraditi samostalno
 - Podatke prikazati tabelarno

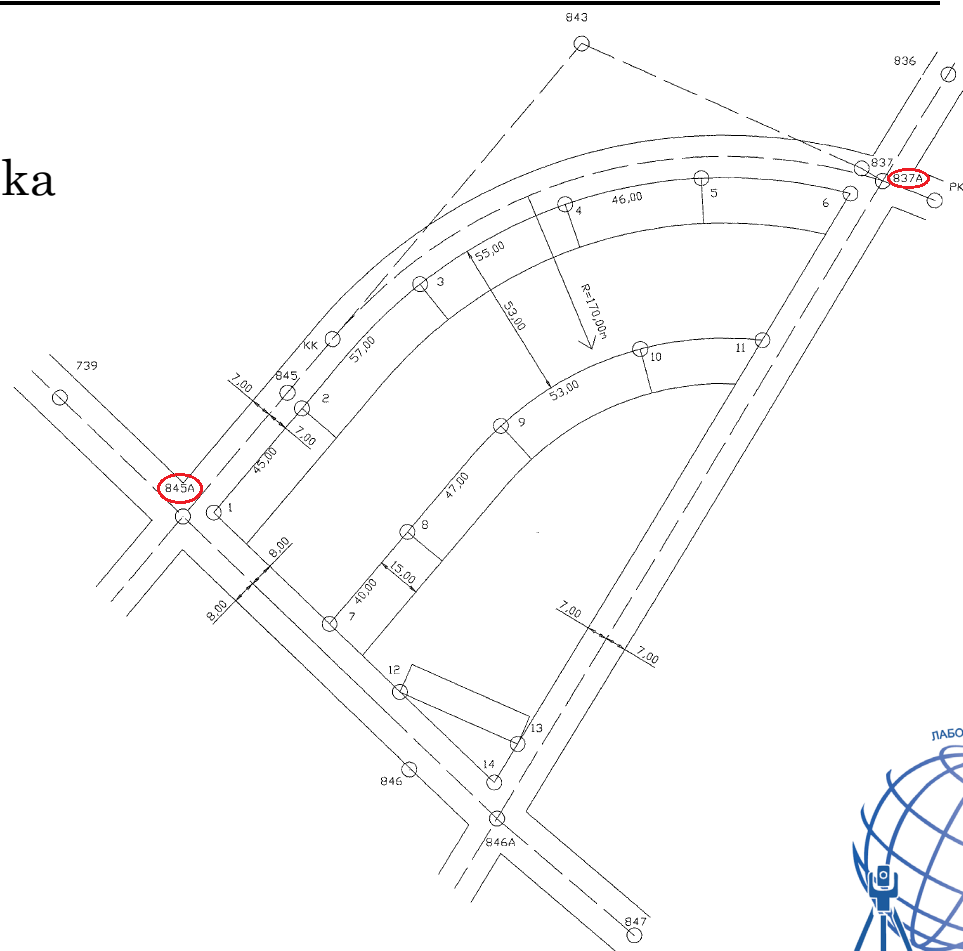
Br. Tačke	Y	X
1	5000.00	5000.00
2	3200.00	2555.55

Stanica	Vizura	α [° ' "]	d [m]
ST1	OR1	0 00 00	/
	T1	vrednost	vrednost



Vežba 1

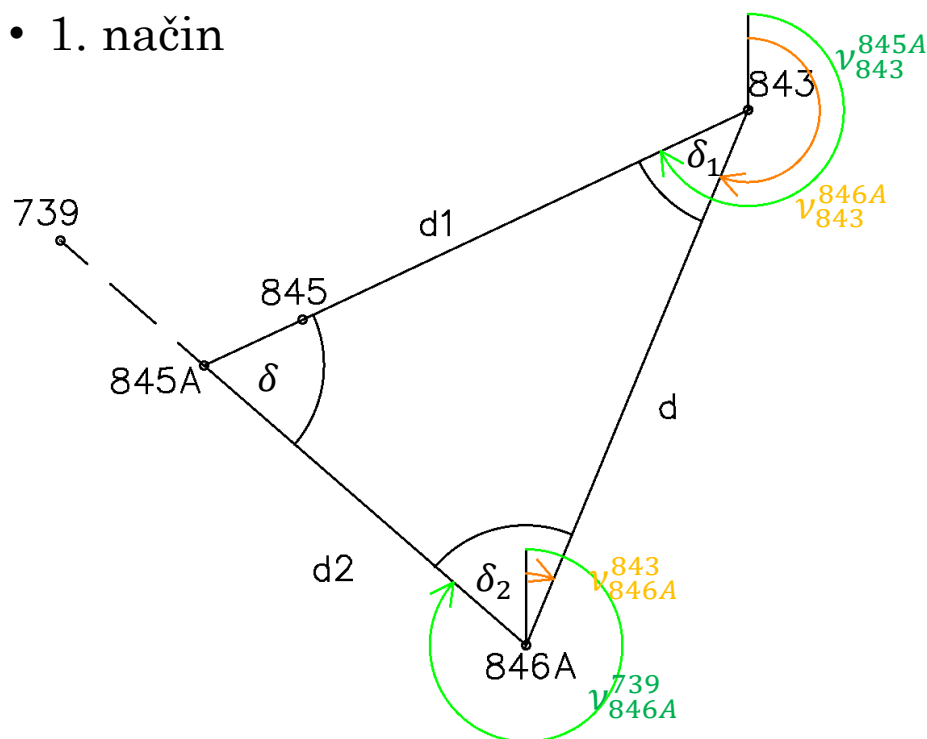
- Analitička razrada bloka
 - Izračunati koordinate osovinskih tačaka -Koordinate 845A i 837A
 - Koordinate detaljnih tačaka prednje frontove lamela prve zgrade - Koordinate 1, 2, 3, 4, 5, 6
 - Koordinate detaljnih tačaka prednje frontove lamela druge zgrade - Koordinate 7, 8, 9, 10, 11
 - Podatke za obeležavanje -Polarno obeležavanje 12 i 13



Vežba 1

• Računanje koordinata TAČKE 845A

• 1. način



$$\varphi_1 = v_{843}^{845} =$$

$$\varphi_2 = v_{846A}^{739} =$$

$$\delta_1 = v_{843}^{845} - v_{843}^{846A} =$$

$$\delta_2 = 360^\circ - (v_{846A}^{739} - v_{846A}^{843}) =$$

$$\delta = 180^\circ - (\delta_1 + \delta_2) =$$

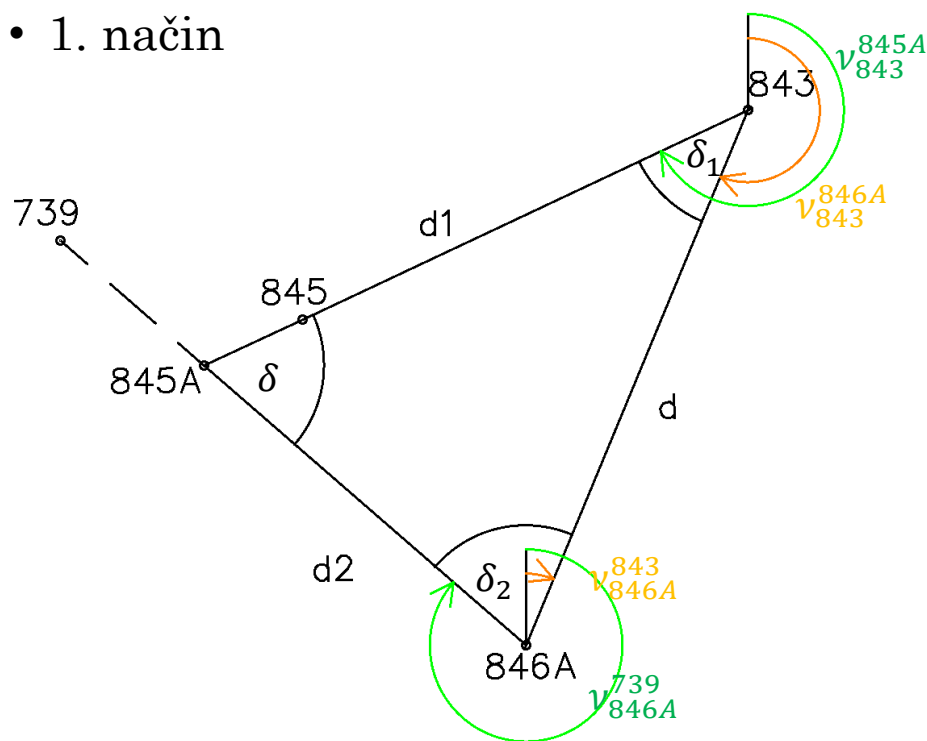
$$\delta = v_{739}^{846A} - v_{845}^{843} =$$



Vežba 1

• Računanje koordinata TAČKE 845A

• 1. način



$$\varphi_1 = v_{843}^{845} = 219^\circ 50' 12''$$

$$\varphi_2 = v_{846A}^{739} = 313^\circ 48' 14''$$

$$\delta_1 = v_{843}^{845} - v_{843}^{846A} = 33^\circ 52' 13''$$

$$\delta_2 = 360^\circ - (v_{846A}^{739} - v_{846A}^{843}) = 52^\circ 09' 45''$$

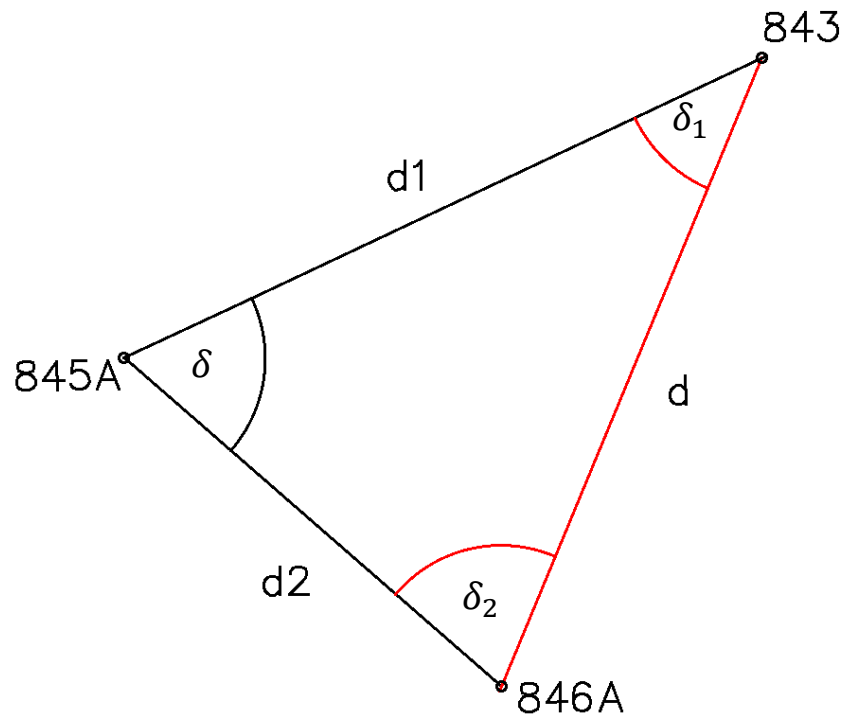
$$\delta = 180^\circ - (\delta_1 + \delta_2) = 93^\circ 58' 02''$$

$$\delta = v_{739}^{846A} - v_{845}^{843} = 93^\circ 58' 02''$$



Vežba 1

DATO: d , δ_1 , δ_2



$$\frac{d_2}{\sin \delta_1} = \frac{d_1}{\sin \delta_2} = \frac{d}{\sin \delta} = m$$

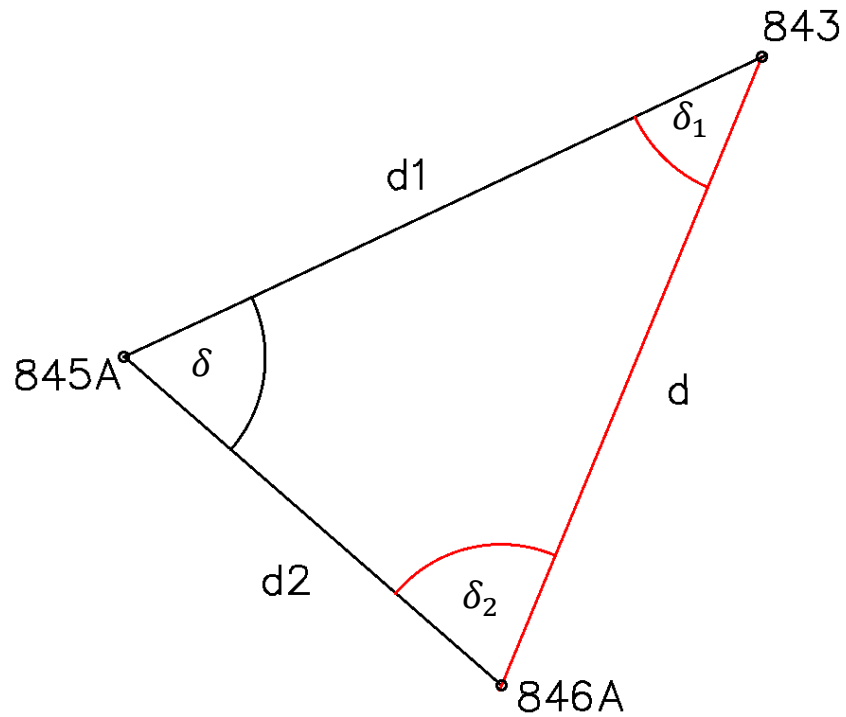
$$d_1 = m * \sin \delta_2 =$$

$$d_2 = m * \sin \delta_1 =$$



Vežba 1

DATO: d , δ_1 , δ_2



$$\frac{d_2}{\sin \delta_1} = \frac{d_1}{\sin \delta_2} = \frac{d}{\sin \delta} = m$$

$$d_1 = m * \sin \delta_2 = 204.49\text{m}$$

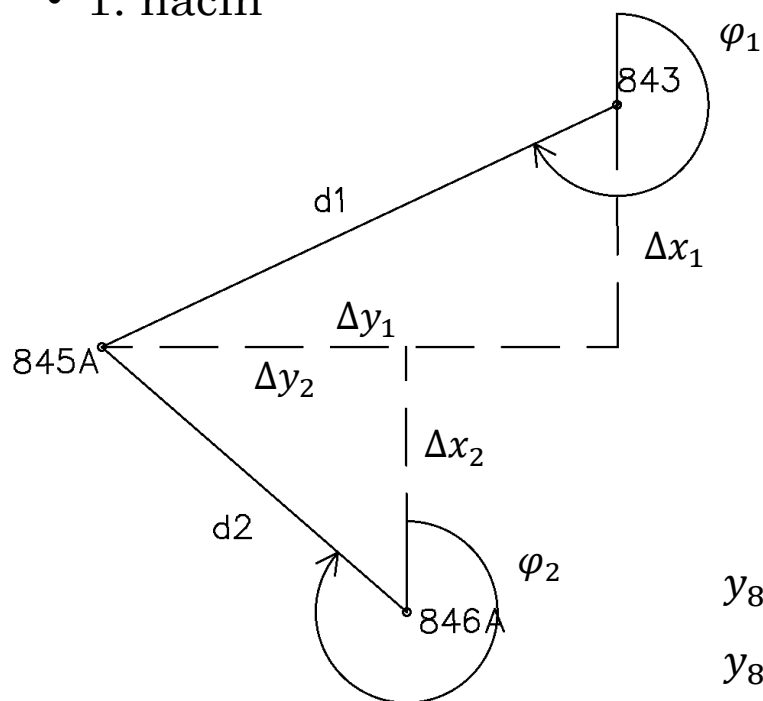
$$d_2 = m * \sin \delta_1 = 144.31\text{m}$$



Vežba 1

• Računanje koordinata TAČKE 845A

• 1. način



$$y_{845A} = y_{843} - \Delta y_1$$

$$y_{845A} =$$

$$\sin(\varphi_1 - 180^\circ) = \frac{\Delta y_1}{d_1}$$

$$\Delta y_1 = d_1 * \sin(\varphi_1 - 180^\circ)$$

$$\Delta y_1 =$$

$$\cos(\varphi_1 - 180^\circ) = \frac{\Delta x_1}{d_1}$$

$$\Delta x_1 = d_1 * \cos(\varphi_1 - 180^\circ)$$

$$\Delta x_1 =$$

$$x_{845A} = x_{843} - \Delta x_1$$

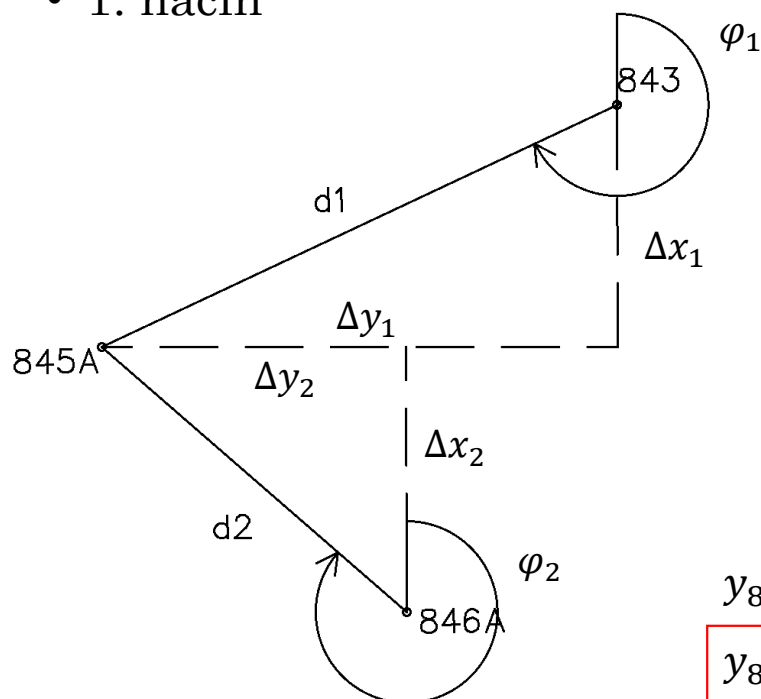
$$x_{845A} =$$



Vežba 1

- Računanje koordinata TAČKE 845A

- 1. način



$$y_{845A} = y_{843} - \Delta y_1$$

$$y_{845A} = 3247.20\text{m}$$

$$\sin(\varphi_1 - 180^\circ) = \frac{\Delta y_1}{d_1}$$

$$\Delta y_1 = d_1 * \sin(\varphi_1 - 180^\circ)$$

$$\Delta y_1 = 131.00\text{m}$$

$$\cos(\varphi_1 - 180^\circ) = \frac{\Delta x_1}{d_1}$$

$$\Delta x_1 = d_1 * \cos(\varphi_1 - 180^\circ)$$

$$\Delta x_1 = 157.02\text{m}$$

$$x_{845A} = x_{843} - \Delta x_1$$

$$x_{845A} = 8896.48\text{m}$$



Vežba 1

Kontrola:

$$\sin(360^\circ - \varphi_2) = \frac{\Delta y_2}{d_2}$$

$$\Delta y_2 = d_2 * \sin(360^\circ - \varphi_2)$$

$$\Delta y_2 =$$

$$y'_{845A} = y_{846A} - \Delta y_2$$

$$y'_{845A} =$$

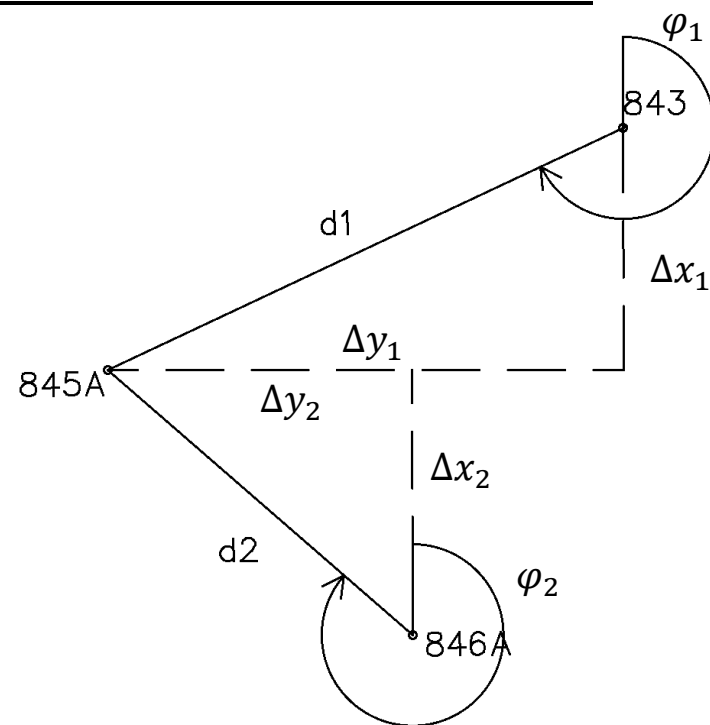
$$\cos(360^\circ - \varphi_2) = \frac{\Delta x_2}{d_2}$$

$$\Delta x_2 = d_2 * \cos(360^\circ - \varphi_2)$$

$$\Delta x_2 =$$

$$x'_{845A} = x_{846A} + \Delta x_2$$

$$x'_{845A} =$$



Vežba 1

Kontrola:

$$\sin(360^\circ - \varphi_2) = \frac{\Delta y_2}{d_2}$$

$$\Delta y_2 = d_2 * \sin(360^\circ - \varphi_2)$$

$$\Delta y_2 = 104.15\text{m}$$

$$y'_{845A} = y_{846A} - \Delta y_2$$

$$y'_{845A} = 3247.20\text{m}$$

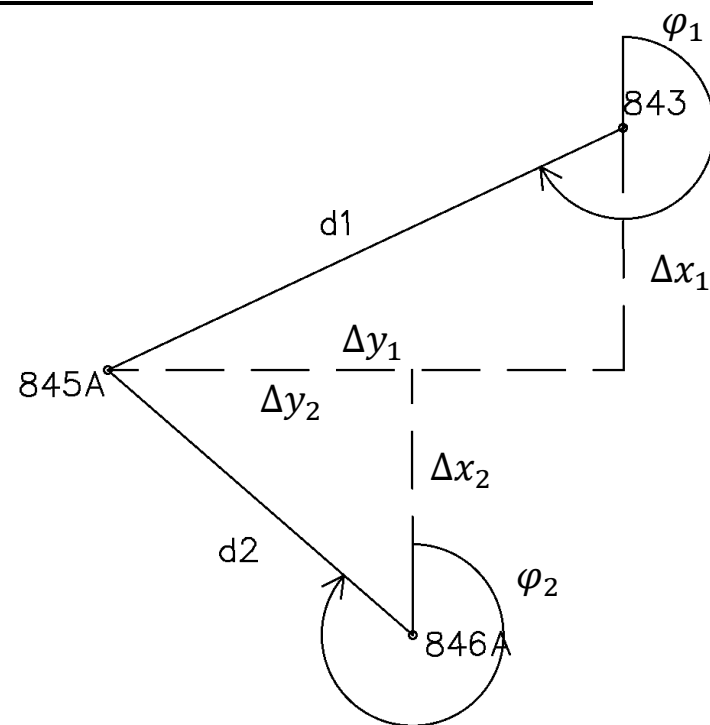
$$\cos(360^\circ - \varphi_2) = \frac{\Delta x_2}{d_2}$$

$$\Delta x_2 = d_2 * \cos(360^\circ - \varphi_2)$$

$$\Delta x_2 = 99.89\text{m}$$

$$x'_{845A} = x_{846A} + \Delta x_2$$

$$x'_{845A} = 8896.48\text{m}$$



Vežba 1

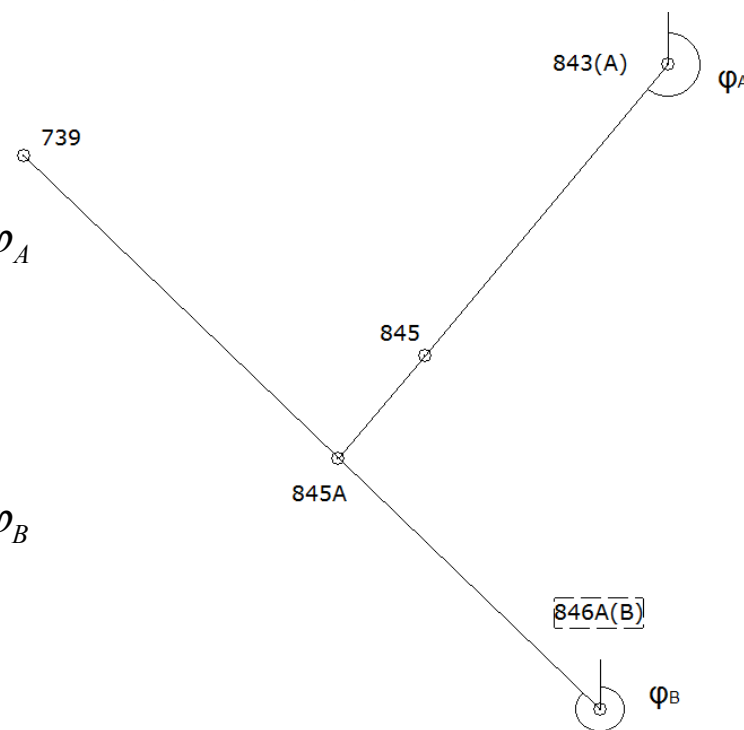
- Računanje koordinata TAČKE 845A
 - 2. način -Presek pravaca napred sa tačaka 843(A) i 846(B)
 - Tačke 843, 845 i 845A su na liniji
 - Tačke 846A, 739 i 845A su na liniji

$$Y_{845A} = Y_A + \frac{\Delta y_B^A - \Delta x_B^A \tan \varphi_B}{\tan \varphi_A - \tan \varphi_B} \tan \varphi_A$$

$$X_{845A} = X_A + \frac{\Delta y_B^A - \Delta x_B^A \tan \varphi_B}{\tan \varphi_A - \tan \varphi_B}$$

$$Y_{845A} = Y_B + \frac{\Delta y_B^A - \Delta x_B^A \tan \varphi_A}{\tan \varphi_A - \tan \varphi_B} \tan \varphi_B$$

$$X_{845A} = X_B + \frac{\Delta y_B^A - \Delta x_B^A \tan \varphi_A}{\tan \varphi_A - \tan \varphi_B}$$

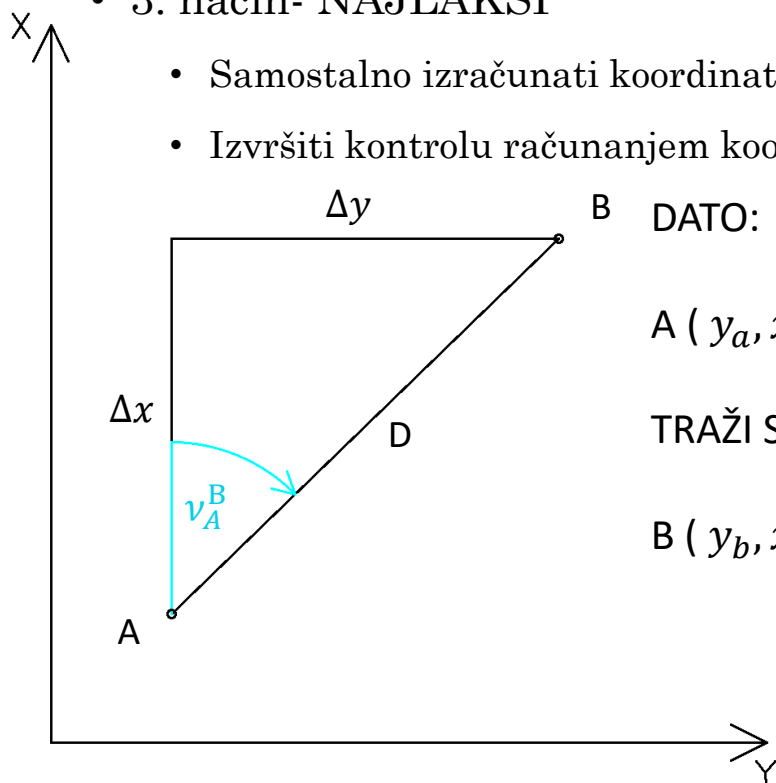


Vežba 1

• Računanje koordinata TAČKE 845A

• 3. način- NAJLAKŠI

- Samostalno izračunati koordinate tačke 845A preko tačke 843 (direkcionni ugao i dužina)
- Izvršiti kontrolu računanjem koordinata tačke 845A preko 846A



DATO:

A (y_a, x_a), d, v_A^B

TRAŽI SE:

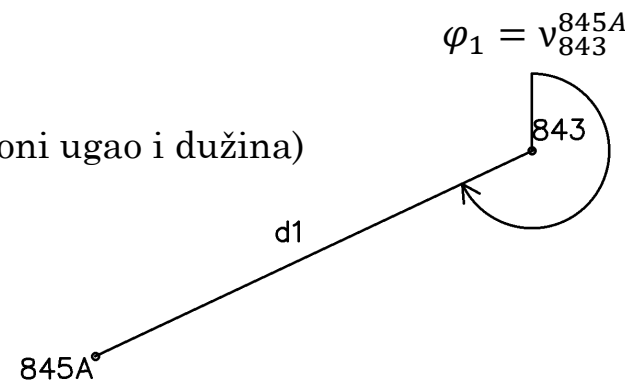
B (y_b, x_b)

$$\Delta y = D * \sin v_A^B$$

$$\Delta x = D * \cos v_A^B$$

$$y_B = y_A + \Delta y$$

$$x_B = x_A + \Delta x$$



$$y_{845A} = y_{843} + d_1 \sin \varphi_1$$

$$x_{845A} = x_{843} + d_1 \cos \varphi_1$$



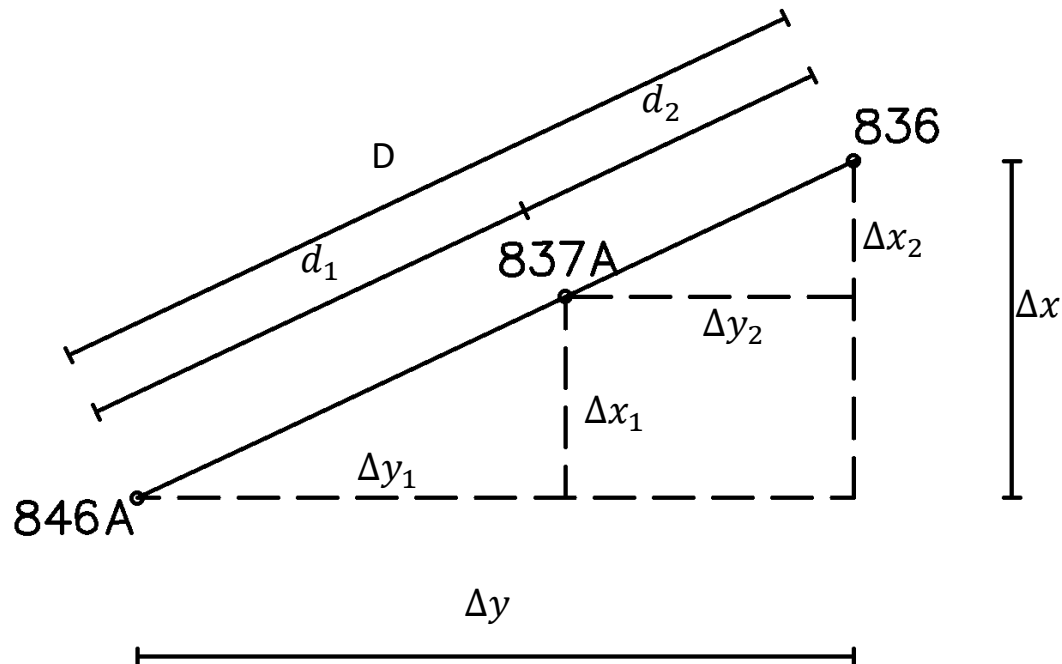
Vežba 1

- Računanje koordinata TAČKE 837A
 - Presek prave koju definišu tačke 846A i 836 i kružni luk
 - Do tačke 837A dolazimo računanjem kao tačke na liniji 846A-836



Vežba 1

- Računanje koordinata TAČKE 837A



$$\frac{\Delta y}{D} = \frac{\Delta y_1}{d_1} \quad \Delta y_1 = d_1 * \frac{\Delta y}{D}$$

$$\frac{\Delta x}{D} = \frac{\Delta x_1}{d_1} \quad \Delta x_1 = d_1 * \frac{\Delta x}{D}$$

$$\frac{\Delta y}{D} = \frac{\Delta y_2}{d_2} \quad \Delta y_2 = d_2 * \frac{\Delta y}{D}$$

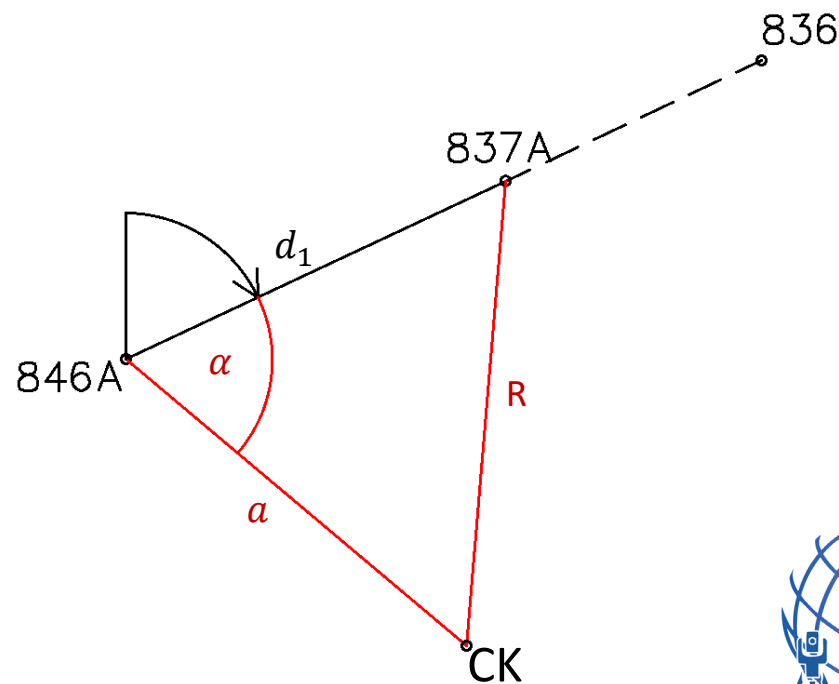
$$\frac{\Delta x}{D} = \frac{\Delta x_2}{d_2} \quad \Delta x_2 = d_2 * \frac{\Delta x}{D}$$



Vežba 1

- Računanje koordinata TAČKE 837A

- D se računa iz koordinata 846A i 836
- Nepoznate: d_1 , d_2
- Potrebno je rešiti trougao, ali su nepoznate α , a (R je dato u zadatku)
 - Da bismo njih dobili potrebno je odrediti koordinate tačke CK

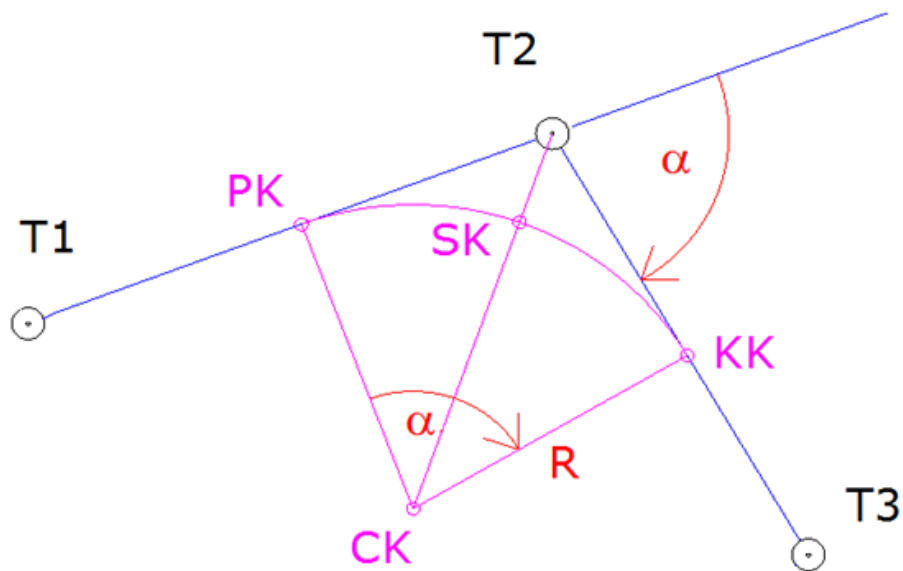


Vežba 1

- Kružna krivina

- Kružna krivina je deo kruga tj. kružni luk sa poluprečnikom R i sa centrom u tački CK

$$\alpha = \nu_{T2}^{T3} - \nu_{T1}^{T2}$$

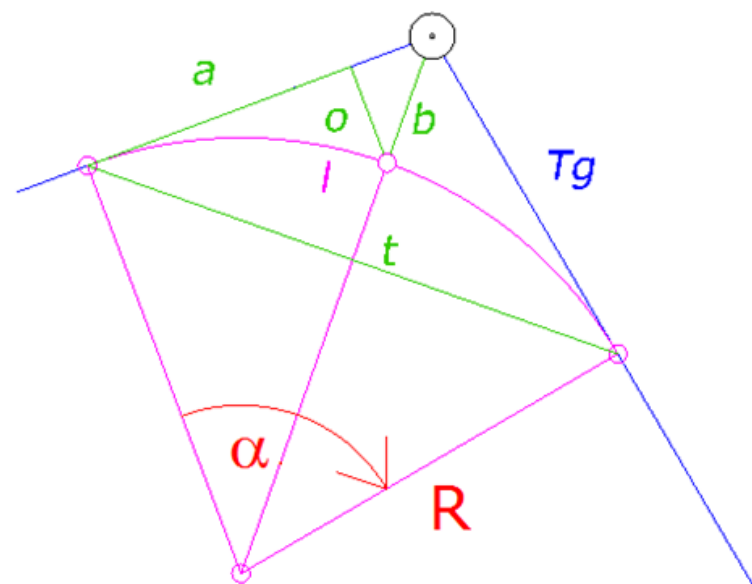


- α – Skretni ugao
- PK – Početak krivine
- SK – Sredina krivine
- KK – Kraj krivine
- CK – Centar krivine



Vežba 1

• Kružna krivina



Tangenta $Tg = R \cdot \tan\left(\frac{\alpha}{2}\right)$

Bisektrisa $b = R \left(\frac{1}{\cos\left(\frac{\alpha}{2}\right)} - 1 \right)$

Tetiva $t = 2 \cdot R \cdot \sin\left(\frac{\alpha}{2}\right)$

Luk $l = \frac{R \cdot \pi \cdot \alpha}{180}$

Apscisa $a = R \cdot \sin\left(\frac{\alpha}{2}\right)$

Ordinata $o = R \left(1 - \cos\left(\frac{\alpha}{2}\right) \right)$



Vežba 1

- Kružna krivina
 - Elementi krivine

$$\alpha = \nu_{843}^{837} - \nu_{845}^{843}$$

$$\alpha =$$

$$Tg =$$

