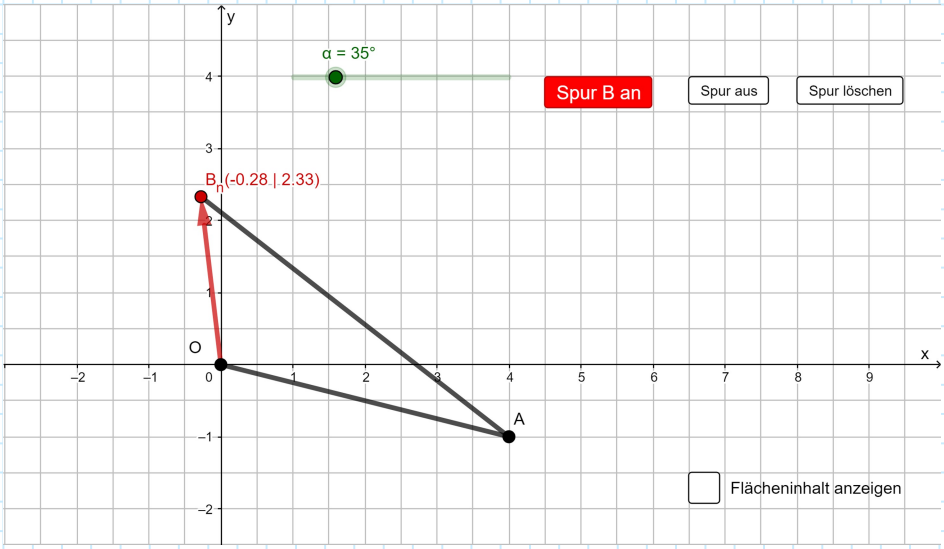
WeMaBy 10I 84/2



b)

Für die Koordinaten von B_n gilt:

$$x = 3 - 4\cos\varphi \quad (I)$$

$$y = \sin^2\varphi + 2 \quad (II)$$

I: $4\cos\varphi = 3 - x$

$\cos\varphi = \frac{3}{4} - \frac{1}{4}x$

$\sqrt{1 - \sin^2\varphi} = 0{,}75 - 0{,}25x$

$1 - \sin^2\varphi = 0{,}75^2 - 0{,}375x + 0{,}0625x^2$

$\sin^2\varphi = -0{,}0625x^2 + 0{,}375x + 0{,}4375$ in (II)

$\Rightarrow y = -0{,}0625x^2 + 0{,}375x + 2{,}4375$

c) $\vec{OA} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$; $\vec{OB_\varphi} = \begin{pmatrix} 3 - 4\cos\varphi \\ \sin^2\varphi + 2 \end{pmatrix}$

$$A = \frac{1}{2} \cdot \left| \begin{matrix} 4 & 3 - 4\cos\varphi \\ -1 & \sin^2\varphi + 2 \end{matrix} \right| \text{ FE}$$

$$= \frac{1}{2} \left(4(\sin^2\varphi + 2) - (-1) \cdot (3 - 4\cos\varphi) \right) \text{FE}$$

$$= \frac{1}{2} \left(4\sin^2\varphi + 8 + 3 - 4\cos\varphi \right) \text{FE}$$

$$= \left(2\sin^2\varphi + 5{,}5 - 2\cos\varphi \right) \text{FE}$$

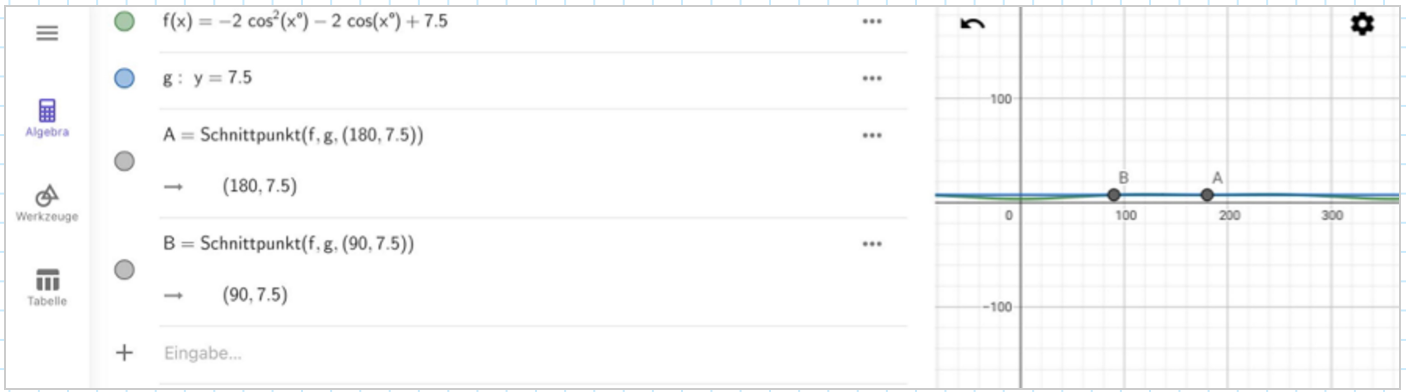
$$= \left(2 \cdot (1 - \cos^2\varphi) + 5{,}5 - 2\cos\varphi \right) \text{FE}$$

$$= \left(-2\cos^2\varphi - 2\cos\varphi + 7{,}5 \right) \text{FE}$$

d) $(-2\cos^2\varphi - 2\cos\varphi + 7{,}5)\ \text{FE} = 7{,}5\ \text{FE}$

$$-2\cos^2\varphi - 2\cos\varphi = 0$$

GR:



$\varphi_1 = 90°$ ∧ $\varphi_2 = 180°$

e) $x_B = 0 \iff 3 - 4\cos\varphi = 0$

$\frac{3}{4} = \cos\varphi$

$\Rightarrow \varphi = 41{,}41°$