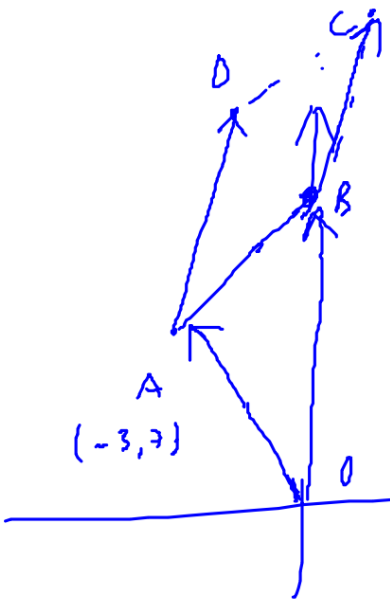
MAB 8 Mallikoe

3.



Lävistäjävektorit

$\overline{AC} = 4\bar{i} + 7\bar{j}$

$|\overline{AC}| = \sqrt{4^2+7^2}$

$\overline{DB} = 2\bar{i} - 5\bar{j}$

$|\overline{DB}| = \sqrt{2^2+5^2}$

$\overline{OD} = \overline{OA} + \overline{AD}$

$= -3\bar{i} + 7\bar{j} + \bar{i} + 5\bar{j}$

$= (-2\bar{i} + 12\bar{j})$

$\rightarrow D = (-2, 12)$

$\overline{AC} \cdot \overline{DB} = 4 \cdot 2 + 7 \cdot (-5)$

$= -27$

$\cos\alpha = \dfrac{-27}{\sqrt{65} \cdot \sqrt{29}} = -0{,}6219$

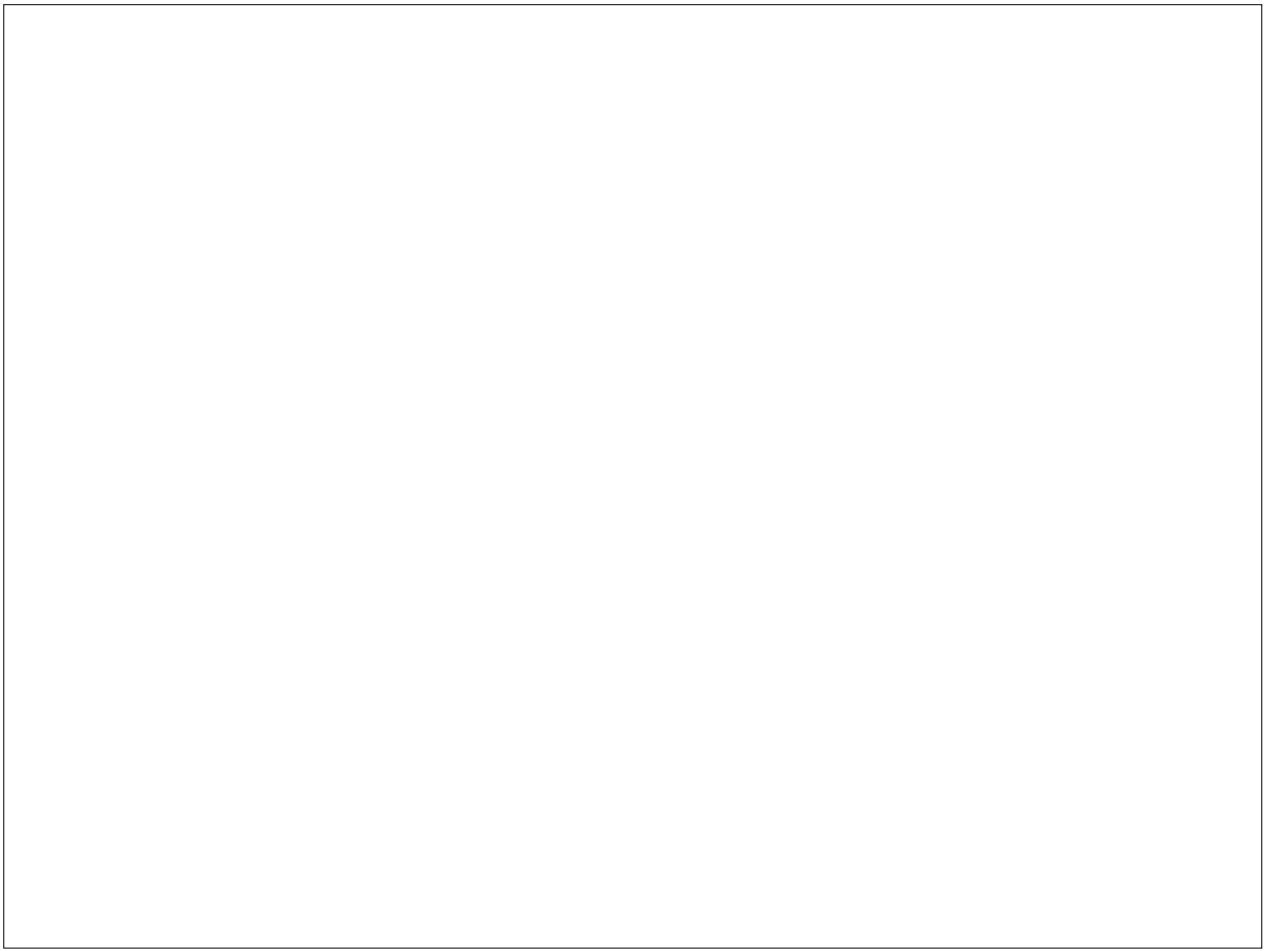
$\rightarrow (\alpha \approx 128{,}5^\circ)$

$\overline{OB} = \overline{OA} + \overline{AB} = -3\bar{i} + 7\bar{j} + 3\bar{i} + 2\bar{j}$

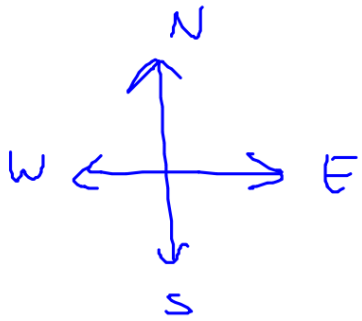
$= (9\bar{j})$

$B = (0, 9)$

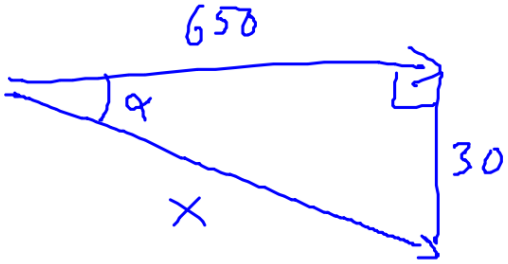
$\overline{OC} = \overline{OB} + \overline{BC} = 9\bar{j} + \overline{AD} = (\bar{i} + 14\bar{j}) \rightarrow C = (1, 14)$



4.



a)



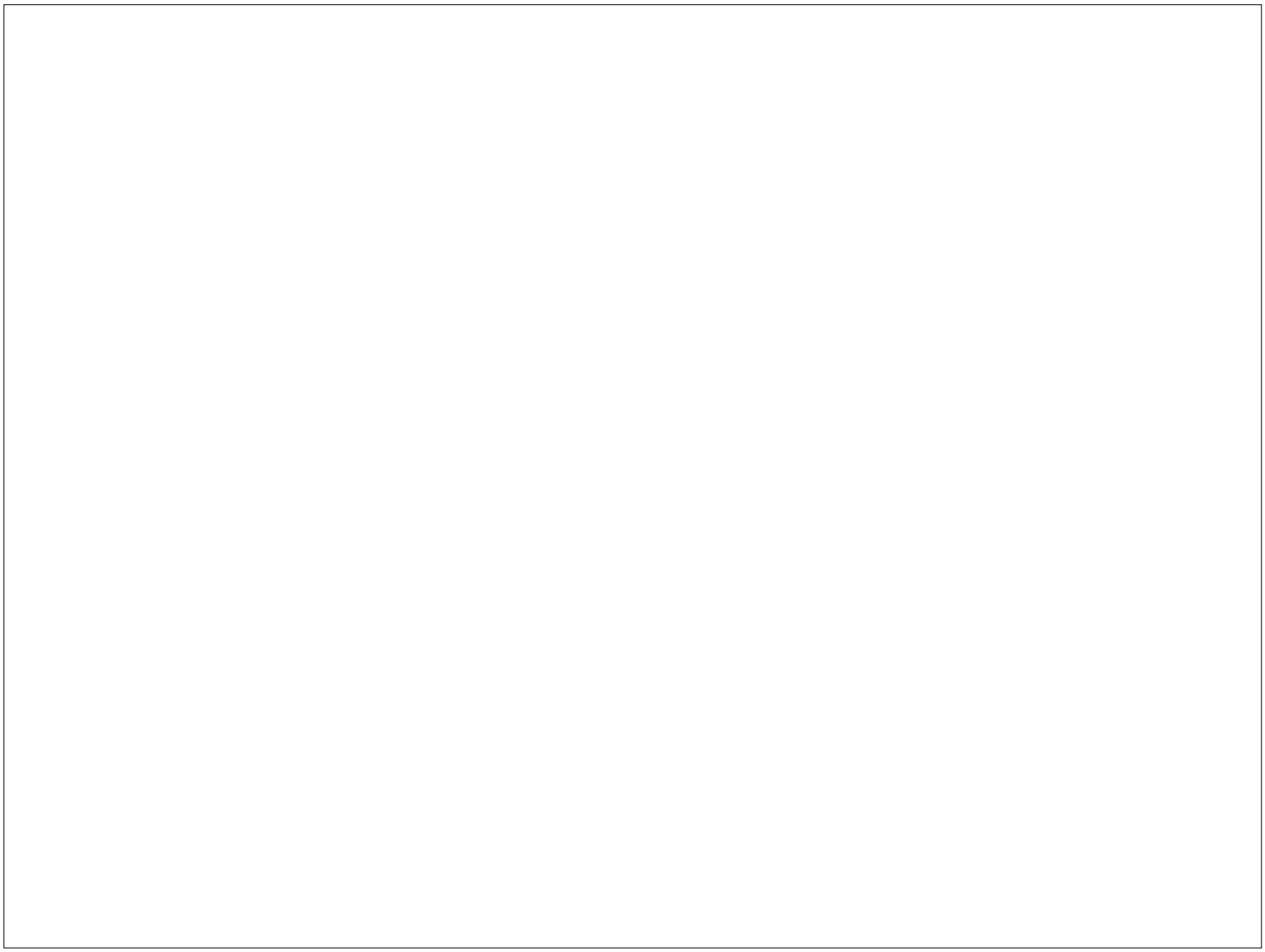
$$x^2 = 650^2 + 30^2 = 423400 \quad /\sqrt{}$$

$$x = 650{,}69$$

$$\tan \alpha = \frac{30}{650} \rightarrow \alpha = 2{,}6°$$

b)

V: 2,6°, 650,7 km/h



5. a) $\overline{AB} = (-1-2)\bar{i} + (2-(-3))\bar{j} + (1-0)\bar{k}$ 1p

$= -3\bar{i} + 5\bar{j} + \bar{k}$ 1p

$|\overline{AB}| = \sqrt{(-3)^2 + 5^2 + 1^2} = \sqrt{35}$ 1p

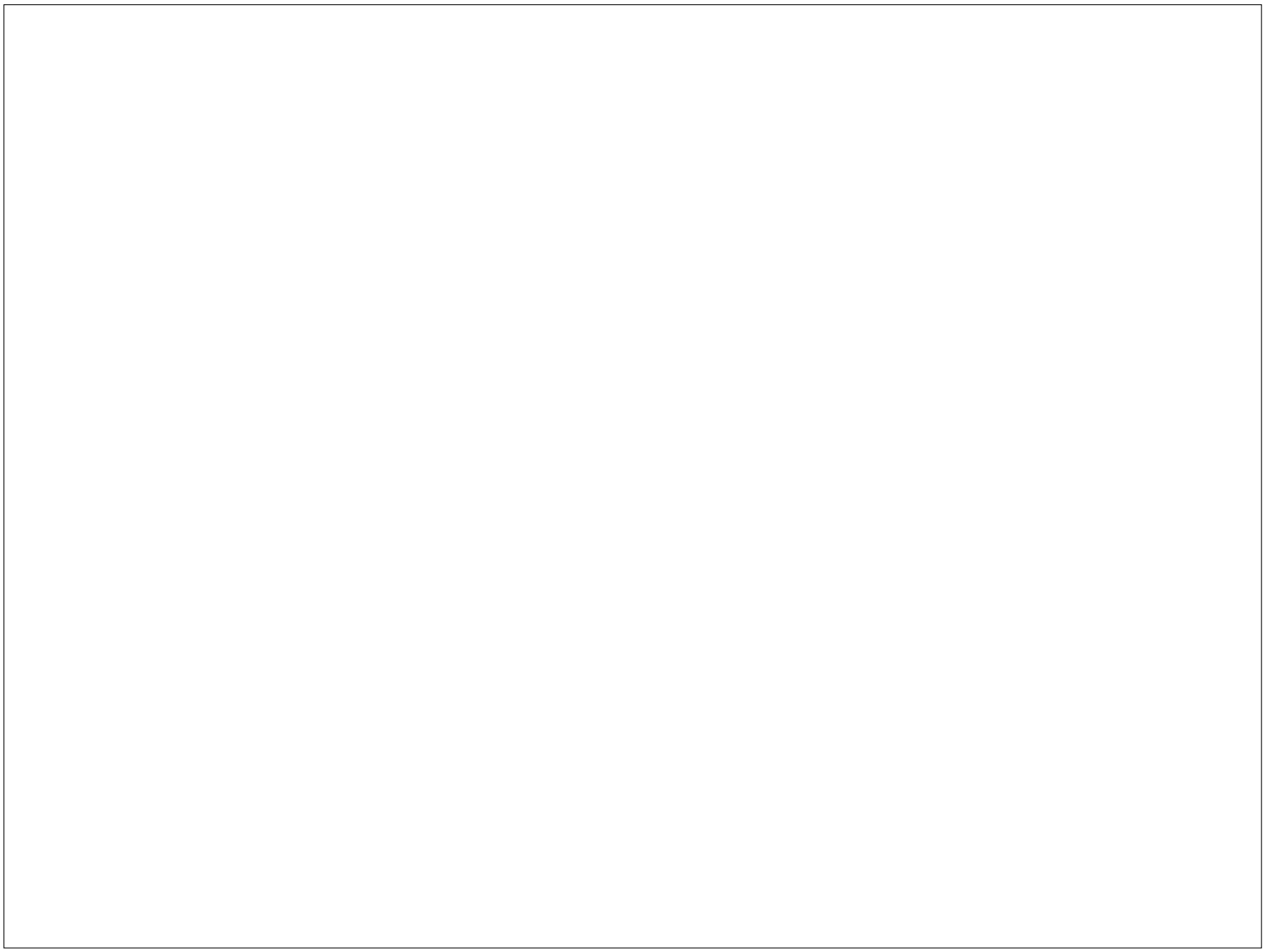
b) $\bar{a} = 3\bar{i} + 2\bar{j}$

$\bar{b} = -\frac{3}{2}\bar{i} + 2\frac{1}{2}\bar{j}$

$\bar{a} \cdot \bar{b} = 3 \cdot (-1{,}5) + 2 \cdot 2{,}5 = -4{,}5 + 5$ 2p

$= 0{,}5$

Vieivät oik. 1p



6. a) $6\cos(2\alpha) + 1 = 6$

$6 \cdot \cos 2\alpha = 5 \quad | : 6$

$\cos 2\alpha = 0{,}83333$

$2\alpha = \pm 33{,}56 + n\,360° \quad | : 2$

$\alpha = \pm 16{,}78 + n\,180°$

b)

x	α
2π	$360°$
x	$145°$

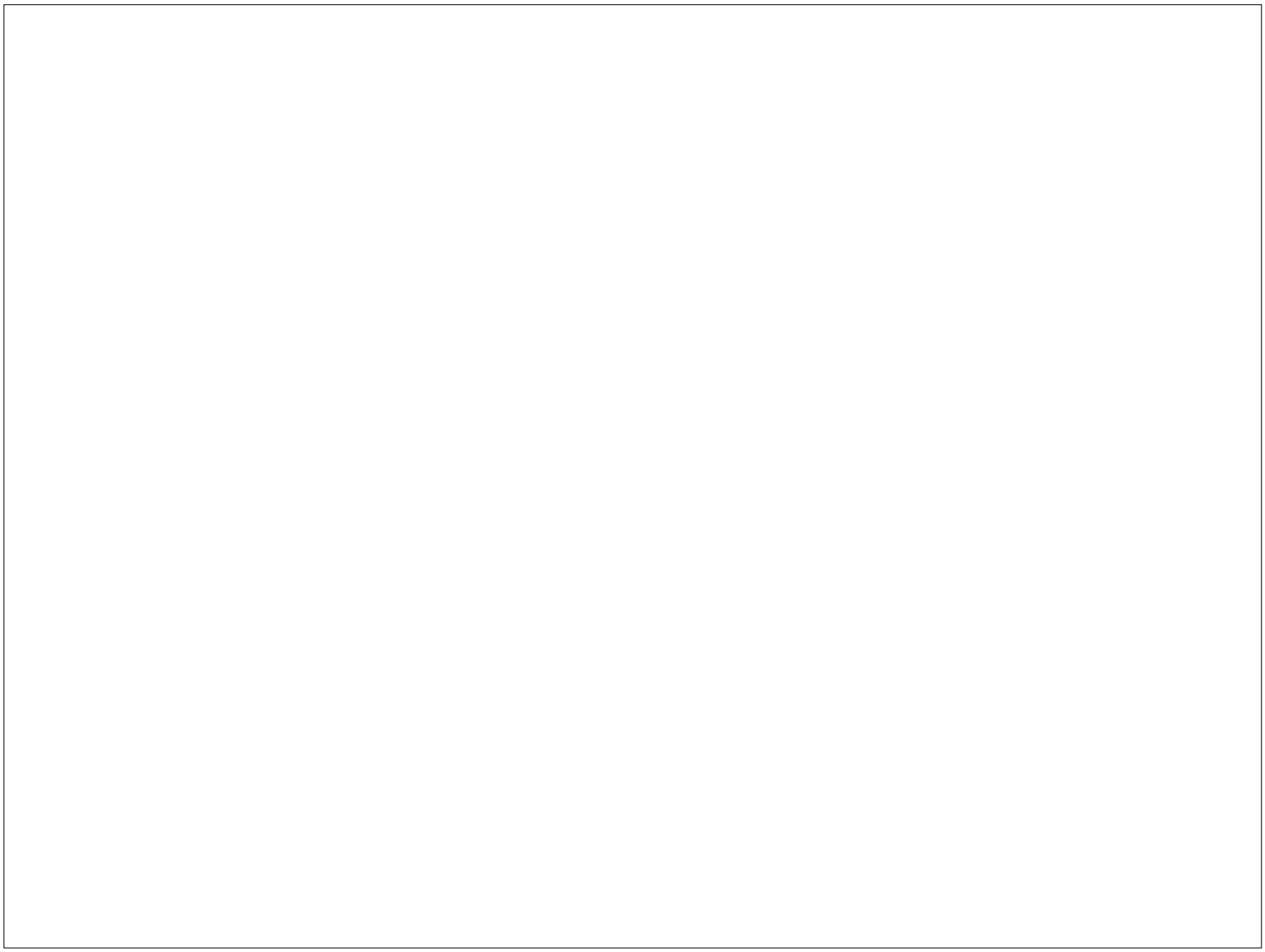
$\frac{2\pi}{x} = \frac{360°}{145°}$

$x = \frac{2\pi \cdot 145}{360} = 2{,}53$

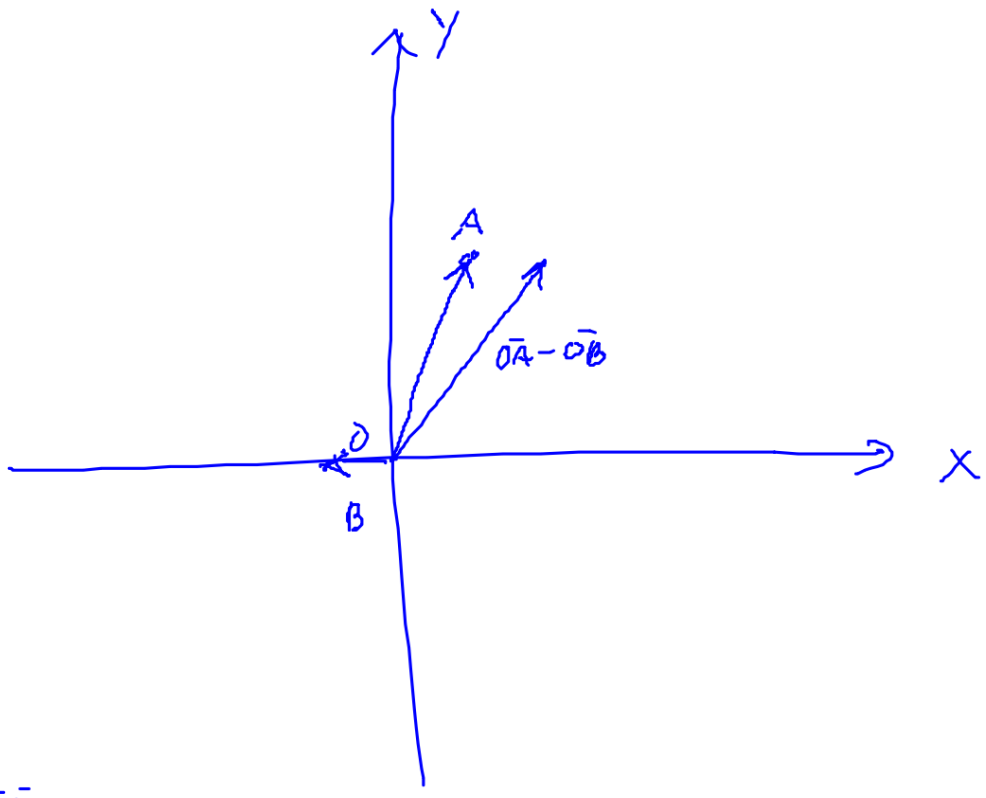
c)

2π	$360°$
$-2{,}58$	α

$\alpha = -\frac{2{,}58 \cdot 360°}{2\pi} = -147{,}83°$



7.



$A = (2, 5)$

$\bar{OA} = 2\bar{i} + 5\bar{j}$

$B = (-1, 0)$

$\bar{OB} = -\bar{i}$

$\bar{OA} - \bar{OB} = 2\bar{i} + 5\bar{j} - (-\bar{i}) = 3\bar{i} + 5\bar{j}$