

Exercice 1

$$\vec{DC} \cdot \vec{DF} = \vec{DC} \cdot \vec{DH} = 8 \times 4 = 32$$

$$\vec{AB} \cdot \vec{CB} = 0$$

$$\vec{AD} \cdot \vec{CB} = 6 \times 6 \times (-1) = -36$$

$$\vec{DC} \cdot \vec{CF} = -\vec{CD} \cdot \vec{CF} = -8 \times 8 \times \cos(60^\circ) = -8 \times 8 \times \frac{1}{2} = -32$$

$$\vec{BD} \cdot \vec{BE} = (\vec{BA} + \vec{AD}) \cdot \vec{BE} = \vec{BA} \cdot \vec{BE} = 8 \times 6\sqrt{3} \times (-1) = -48\sqrt{3}$$

Trigonométrie dans le triangle BCE rectangle en B

$$\tan 60 = \frac{BE}{6} \Leftrightarrow BE = 6 \tan(60) = 6\sqrt{3}$$

$$\vec{BC} \cdot \vec{CE} = -\vec{CB} \cdot \vec{CE} = -\vec{CB} \cdot \vec{CB} = -6 \times 6 = -36$$

Exercice 2

$$\vec{BA} \begin{pmatrix} -3 \\ +2 \end{pmatrix}$$

$$\vec{BC} \begin{pmatrix} 6-4 \\ 6-1 \end{pmatrix} \quad \vec{BC} \begin{pmatrix} 2 \\ 5 \end{pmatrix}$$

$$1) \quad \vec{BA} \cdot \vec{BC} = (-3)(2) + (2)(5) = -6 + 10 = 4$$

$$2) \quad AB = \|\vec{BA}\| = \sqrt{9+4} = \sqrt{13}$$

$$BC = \|\vec{BC}\| = \sqrt{4+25} = \sqrt{29}$$

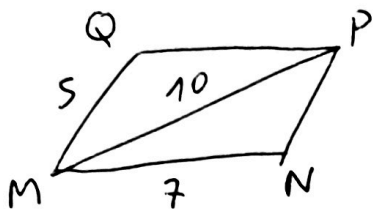
$$3) \quad \vec{BA} \cdot \vec{BC} = BA \times BC \times \cos(\widehat{ABC})$$

$$\Leftrightarrow 4 = \sqrt{13} \times \sqrt{29} \times \cos(\widehat{ABC})$$

$$\cos(\widehat{ABC}) = \frac{4}{\sqrt{13} \sqrt{29}}$$

$$\widehat{ABC} \approx 78^\circ$$

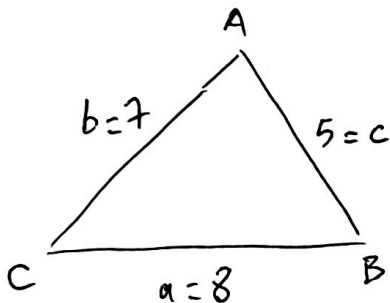
Exercice 3



2/2

$$\begin{aligned} \vec{MN} \cdot \vec{MQ} &= \frac{1}{2} (\|\vec{MN} + \vec{MQ}\|^2 - \|\vec{MN}\|^2 - \|\vec{MQ}\|^2) \\ &= \frac{1}{2} (MP^2 - MN^2 - MQ^2) \\ &= \frac{1}{2} (100 - 49 - 25) \\ &= 13 \end{aligned}$$

Exercice 4



Formule d'Al-Kashi

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A}$$

$$\cos \hat{A} = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos \hat{A} = \frac{49 + 25 - 64}{2 \times 7 \times 5}$$

$$\cos \hat{B} = \frac{64 + 25 - 49}{2 \times 8 \times 5}$$

$$\cos \hat{C} = \frac{64 + 49 - 25}{2 \times 8 \times 7}$$

$$\hat{A} = \arccos\left(\frac{10}{70}\right)$$

$$\hat{B} = \arccos\left(\frac{7}{8}\right)$$

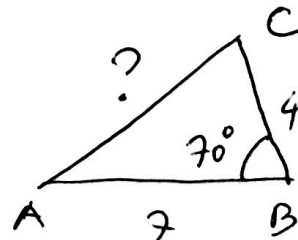
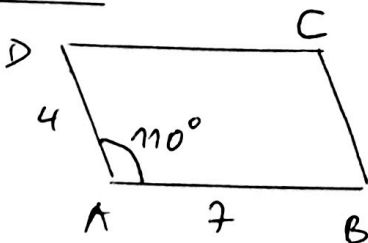
$$\hat{C} = \arccos\left(\frac{88}{112}\right)$$

$$\hat{A} \approx 81,8$$

$$\hat{B} = 60^\circ$$

$$\hat{C} \approx 38,2^\circ$$

Exercice 5



Al-Kashi

$$b^2 = a^2 + c^2 - 2ac \cos \hat{B}$$

$$AC^2 = BC^2 + AB^2 - 2 \times BC \times AB \times \cos \hat{B}$$

$$AC^2 = 16 + 49 - 2 \times 7 \times 4 \times \cos(70^\circ)$$

$$AC^2 = 65 - 56 \cos(70^\circ)$$

$$AC = \sqrt{65 - 56 \cos(70^\circ)}$$

$$AC \approx 6,8$$