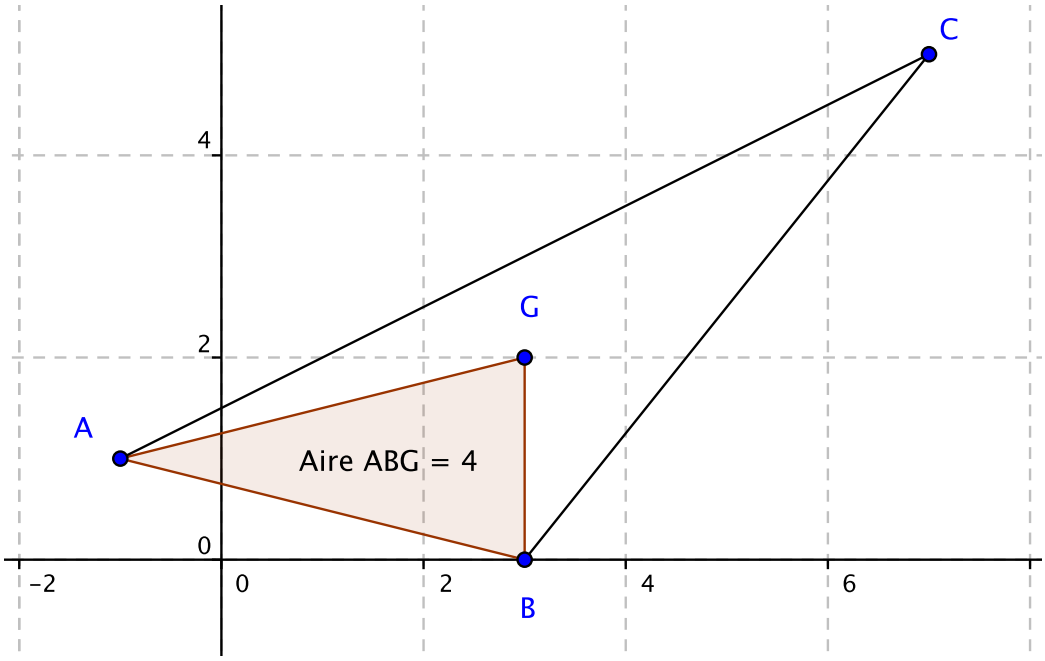
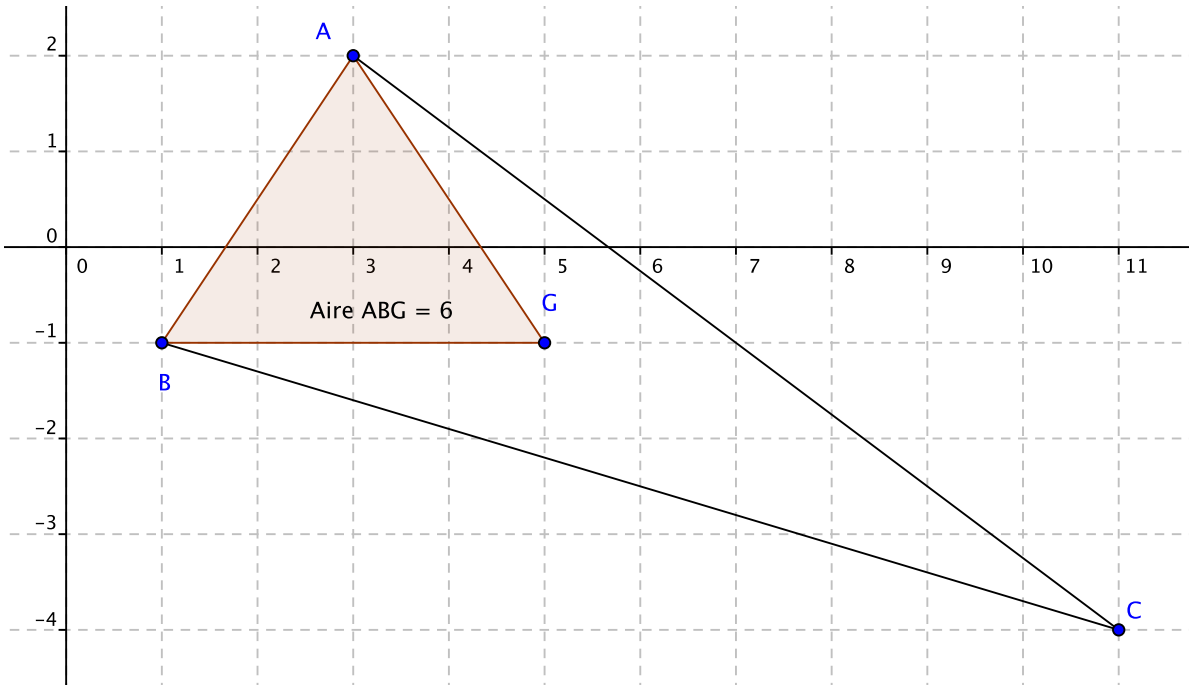
Vecteurs II

Exercice 1.

a)




A
B
G
C
Aire ABG = 6
0
1
2
3
4
5
6
7
8
9
10
11
2
1
0
−1
−2
−3
−4

b) $C(3\cdot 3-(-1)-3;3\cdot 2-1-0)$

$\Rightarrow$ $\boxed{C(7;5)}$

$C(3\cdot 5-3-1;3\cdot(-1)-2-(-1))$

$\Rightarrow$ $\boxed{C(11;-4)}$

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c) $\overrightarrow{AB}=\begin{pmatrix}3-(-1)\\0-1\end{pmatrix}=\begin{pmatrix}4\\-1\end{pmatrix}$

$\overrightarrow{AG}=\begin{pmatrix}3-(-1)\\2-1\end{pmatrix}=\begin{pmatrix}4\\1\end{pmatrix}$

$\overrightarrow{BG}=\begin{pmatrix}3-3\\2-0\end{pmatrix}=\begin{pmatrix}0\\2\end{pmatrix}$

$\Rightarrow \quad \|\overrightarrow{AB}\|=\|\overrightarrow{AG}\|=\sqrt{17}$ u

$\Rightarrow$ $\boxed{\text{le } \Delta\, ABC \text{ est isocèle en } A}$

$\overrightarrow{AB}=\begin{pmatrix}1-3\\-1-2\end{pmatrix}=\begin{pmatrix}-2\\-3\end{pmatrix}$

$\overrightarrow{AG}=\begin{pmatrix}5-3\\-1-2\end{pmatrix}=\begin{pmatrix}2\\-3\end{pmatrix}$

$\overrightarrow{BG}=\begin{pmatrix}5-1\\-1-(-1)\end{pmatrix}=\begin{pmatrix}4\\0\end{pmatrix}$

$\Rightarrow \quad \|\overrightarrow{AB}\|=\|\overrightarrow{AG}\|=\sqrt{13}$ u

$\Rightarrow$ $\boxed{\text{le } \Delta\, ABC \text{ est isocèle en } A}$

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d) $\|\overrightarrow{BG}\|=2 \quad \Rightarrow \quad \frac{1}{2}\|\overrightarrow{BG}\|=1$

Pythagore : $h=\sqrt{17-1^2}=4$ u

$\Rightarrow$ aire du $\Delta\, ABG=\dfrac{4\cdot 2}{2}=\boxed{4 \quad \text{u}^2}$

$\|\overrightarrow{BG}\|=4 \quad \Rightarrow \quad \frac{1}{2}\|\overrightarrow{BG}\|=2$

Pythagore : $h=\sqrt{13-2^2}=3$ u

$\Rightarrow$ aire du $\Delta\, ABG=\dfrac{3\cdot 4}{2}=\boxed{6 \quad \text{u}^2}$

Exercice 2.

$\det(\vec{a};\vec{b})=6\cdot 25-(-10)\cdot(-15)=0$

$\vec{a}\cdot\vec{c}=6\cdot 40+(-10)\cdot 24=0$

$\det(\vec{a};\vec{d})=6\cdot -\left(\dfrac{5}{3}\right)-(-10)\cdot 1=0$

$\Rightarrow$ $\boxed{\vec{a},\ \vec{b},\ \vec{d} \text{ colinéaires et perp. à } \vec{c}}$

$\det(\vec{a};\vec{b})=4\cdot 15-(-12)\cdot(-5)=0$

$\vec{a}\cdot\vec{c}=4\cdot 30+(-12)\cdot 10=0$

$\vec{a}\cdot\vec{d}=4\cdot 2+(-12)\cdot\dfrac{2}{3}=0$

$\Rightarrow$ $\boxed{\vec{a},\ \vec{b} \text{ colinéaires et perp. aux vect. col. } \vec{c} \text{ et } \vec{d}}$

Exercice 3.

$\vec{a}\cdot\vec{b}=(m+2)(m+9)+(-5)(m+5)=$

$m^2+6m-7=(m-1)\cdot(m+7)=0$

$\Rightarrow$ $\boxed{S=\{-7;1\}}$

$\vec{a}\cdot\vec{b}=(m+2)(m+9)+(-5)(m+5)=$

$m^2+m-6=(m-2)\cdot(m+3)=0$

$\Rightarrow$ $\boxed{S=\{-3;2\}}$

Exercice 4.

a) $\overrightarrow{AB} = \begin{pmatrix} -2-(-4) \\ -2-1 \end{pmatrix} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$

$\overrightarrow{AC} = \begin{pmatrix} -1-(-4) \\ 3-1 \end{pmatrix} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

$\overrightarrow{BC} = \begin{pmatrix} -1-(-2) \\ 3-(-2) \end{pmatrix} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$

$\Rightarrow \quad \|\overrightarrow{AB}\| = \|\overrightarrow{AC}\| = \sqrt{13}$ u

$\Rightarrow \quad \|\overrightarrow{BC}\| = \sqrt{26}$ u

b) $M\left(\frac{-4-2}{2}; \frac{1-2}{2}\right) \quad \Rightarrow \boxed{M\left(-3; -\frac{1}{2}\right)}$

$\overrightarrow{AB} = \begin{pmatrix} -1-2 \\ -3-2 \end{pmatrix} = \begin{pmatrix} -3 \\ -5 \end{pmatrix}$

$\overrightarrow{AC} = \begin{pmatrix} -2-2 \\ 1-2 \end{pmatrix} = \begin{pmatrix} -4 \\ -1 \end{pmatrix}$

$\overrightarrow{BC} = \begin{pmatrix} -2-(-1) \\ 1-(-3) \end{pmatrix} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

$\Rightarrow \quad \|\overrightarrow{AC}\| = \|\overrightarrow{BC}\| = \sqrt{17}$ u

$\Rightarrow \quad \|\overrightarrow{AB}\| = \sqrt{34}$ u

$M\left(\frac{2-1}{2}; \frac{2-3}{2}\right) \quad \Rightarrow \boxed{M\left(\frac{1}{2}; -\frac{1}{2}\right)}$

Exercice 5.

a) $\overrightarrow{DC} = \boxed{\begin{pmatrix} \frac{1}{2} \\ 0 \end{pmatrix}}$ $\quad \overrightarrow{BC} = \boxed{\begin{pmatrix} -\frac{1}{2} \\ 1 \end{pmatrix}}$

b) $\overrightarrow{BD} = \boxed{\begin{pmatrix} -1 \\ 1 \end{pmatrix}}$ $\quad \overrightarrow{AM} = \boxed{\begin{pmatrix} \frac{1}{2} \\ 0 \end{pmatrix}}$

c) $\overrightarrow{DM} = \boxed{\begin{pmatrix} \frac{1}{2} \\ -1 \end{pmatrix}}$ $\quad \overrightarrow{CA} = \boxed{\begin{pmatrix} -\frac{1}{2} \\ -1 \end{pmatrix}}$