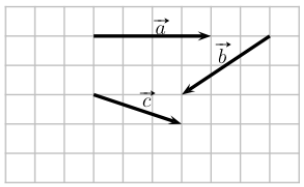
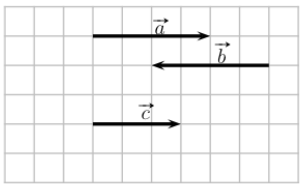
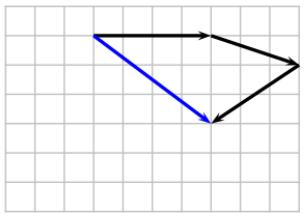
Ex 1.1.3

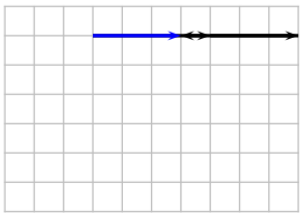
Cas 1 **Cas 2**



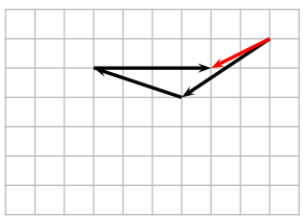


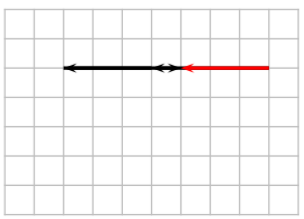
Le vecteur $\vec{a} + \vec{c} + \vec{b}$



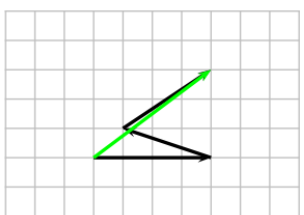


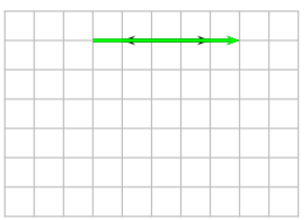
Le vecteur $\vec{b} - \vec{c} + \vec{a}$



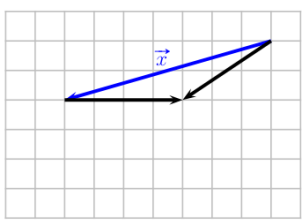


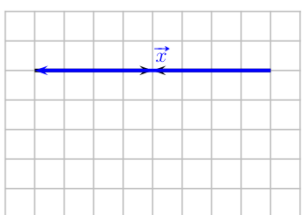
Le vecteur $\vec{a} - \left(\vec{c} + \vec{b}\right)$





Le vecteur $\vec{x}$ tel que $\vec{x} + \vec{a} = \vec{b}$





Ex 1.1.4

a) $\vec{BD} + \vec{AB} + \vec{DC} \overset{\text{commutativité}}{=} \vec{AB} + \vec{BD} + \vec{DC} \overset{\text{Chasles}}{=} \vec{AC}$

b) $\vec{BC} + \vec{DE} + \vec{DC} + \vec{AD} + \vec{EB} = \vec{DE} + \vec{EB} + \vec{BC} + \vec{AD} + \vec{DC} = \vec{DC} + \vec{AC}$

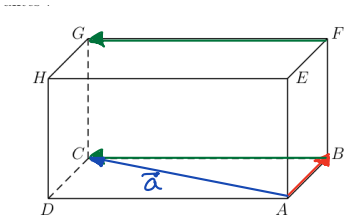
c) $\vec{AC} - \vec{BD} - \vec{AB} \overset{\text{opposé}}{=} \vec{AC} + \vec{DB} + \vec{BA} = \vec{DA} + \vec{AC} = \vec{DC}$

d) $\vec{DA} - \vec{DB} - \vec{CD} - \vec{BC} = \vec{DA} + \vec{BD} + \vec{DC} + \vec{CB} = \vec{DA} + \vec{BB} = \vec{DA} + \vec{0} \overset{\text{élt neutre}}{=} \vec{DA}$

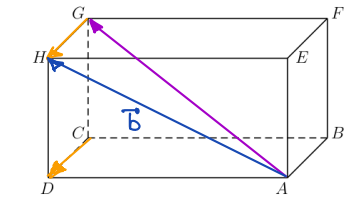
e) $\vec{EC} - \vec{ED} + \vec{CB} - \vec{DB} = \vec{EC} + \vec{DE} + \vec{CB} + \vec{BD} = \vec{EC} + \vec{CB} + \vec{BD} + \vec{DE} = \vec{EE} = \vec{0}$

Ex 1.1.5

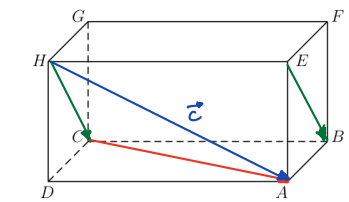
a) $\vec{a} = \vec{AB} + \vec{FG} = \vec{AB} + \vec{BC} = \vec{AC}$



b) $\vec{b} = \vec{AG} + \vec{CD} = \vec{AG} + \vec{GH} = \vec{AH}$

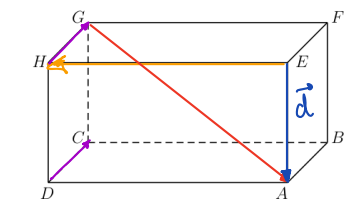


c) $\vec{c} = \vec{EB} + \vec{CA} = \vec{HC} + \vec{CA} = \vec{HA}$

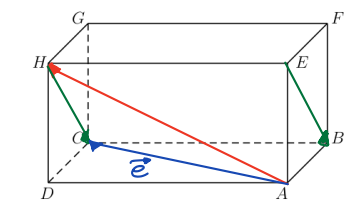


d) $\vec{d} = \vec{EH} + \vec{DC} + \vec{GA}$

$= \vec{EH} + \vec{HG} + \vec{GA} = \vec{EA}$

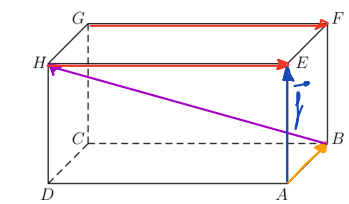


e) $\vec{e} = \vec{AH} + \vec{EB} = \vec{AH} + \vec{HC} = \vec{AC}$



f) $\vec{f} = \vec{AB} + \underbrace{\vec{CC}}_{\vec{0}} + \vec{BH} + \vec{GF}$

$= \vec{AB} + \vec{BH} + \vec{HE} = \vec{AE}$



Ex 1.1.6

a) $\vec{a} = \vec{AB} + \vec{CD} = \vec{AB} + \vec{BO} = \vec{AO} = \vec{FE}$

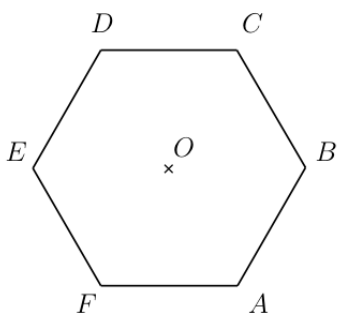
b) $\vec{b} = \vec{AB} + \vec{FE} = \vec{AB} + \vec{BC} = \vec{AC}$

c) $\vec{c} = \vec{AC} - \vec{FE} = \vec{AC} + \vec{EF} = \vec{AC} + \vec{CB} = \vec{AB}$

d) $\vec{d} = \vec{EB} + \vec{DE} = \vec{DE} + \vec{EB} = \vec{DB}$

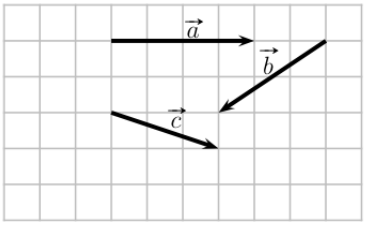
e) $\vec{e} = \vec{FE} + \vec{FE} = \vec{AO} + \vec{OD} = \vec{AD}$

f) $\vec{f} = \vec{FA} + \vec{BC} + \vec{AB} + \underbrace{\vec{DD}}_{\vec{0}} = \vec{FA} + \vec{AB} + \vec{BC} = \vec{FC}$

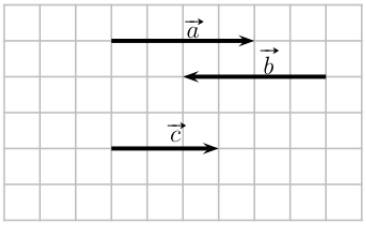


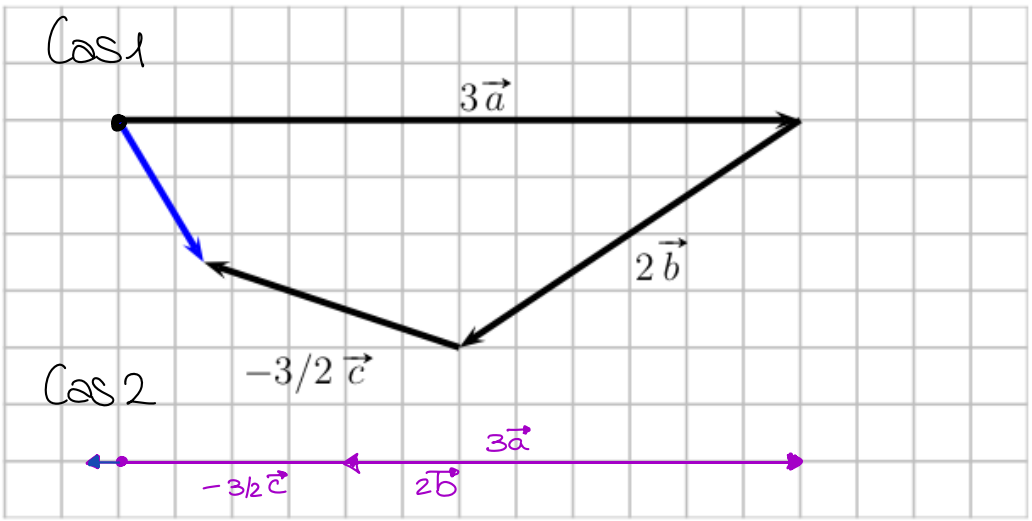
Ex 1.1.7

Cas 1



Cas 2

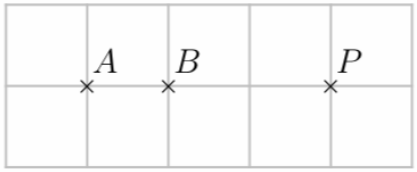




Ex 1.1.8

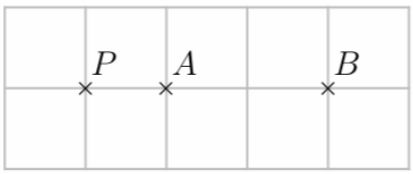
a) $\vec{AP} = 3\vec{AB}$

même origine
$\vec{AP}$ et $\vec{AB}$ même sens
$\|\vec{AP}\| = 3\|\vec{AB}\|$

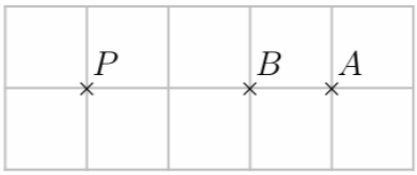


b) $\vec{AP} = \frac{1}{2}\vec{BA}$

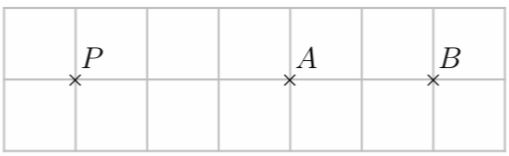
sens opposé
$\|\vec{AP}\| = \frac{1}{2}\|\vec{BA}\|$ ou $\|\vec{BA}\| = 2\|\vec{AP}\|$



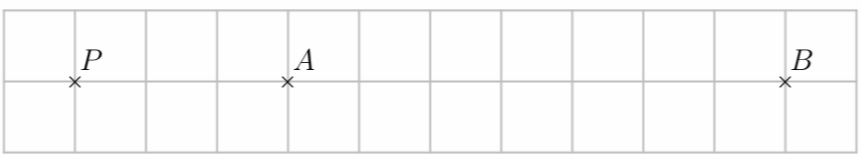
c) $\vec{PA} = -\frac{3}{2}\vec{BP} = \frac{3}{2}\vec{PB}$



d) $\vec{PA} = -\frac{3}{5}\vec{BP} = \frac{3}{5}\vec{PB}$

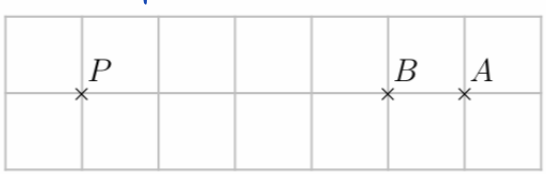


e) $\vec{PA} = \frac{3}{7}\vec{AB}$

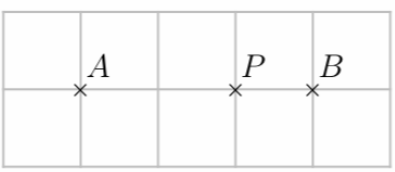


f) $\vec{AP} = \frac{5}{-4}\vec{PB} = -\frac{5}{4}\vec{PB} = \frac{5}{4}\vec{BP}$

ou $\vec{PA} = \frac{5}{4}\vec{PB}$



g) $\vec{PA} = -2\vec{PB} = 2\vec{BP}$



Ex 1.1.9

$$3(\vec{a}-2\vec{v})-6\vec{b} = -7\left(\frac{15}{7}\vec{v}-3\vec{b}\right)+12\vec{a}$$

$$3\vec{a}-6\vec{v}-6\vec{b} = -15\vec{v}+21\vec{b}+12\vec{a}$$

$$9\vec{v} = 9\vec{a}+27\vec{b}$$

$$\vec{v} = \vec{a}+3\vec{b}$$

Ex 1.1.10

a) $\vec{PQ} = \frac{1}{2}\vec{BC} \Leftrightarrow 2\vec{PQ} = \vec{BC}$

b) $2\vec{PQ} = 2(\vec{PB}+\vec{BC}+\vec{CQ}) = \vec{AB}+2\vec{BC}+\vec{CA} = \underbrace{\vec{AB}+\vec{BC}+\vec{CA}}_{\vec{AA}=\vec{0}}+\vec{BC}$

$= \vec{BC}$ #

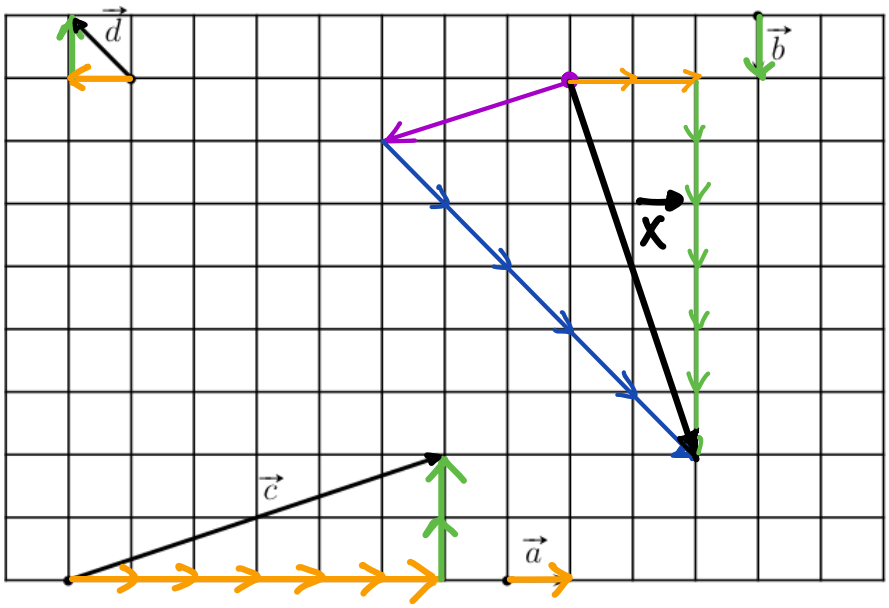
Ex 1.1.11

a) $\vec{c} = 6\vec{a}-2\vec{b}$

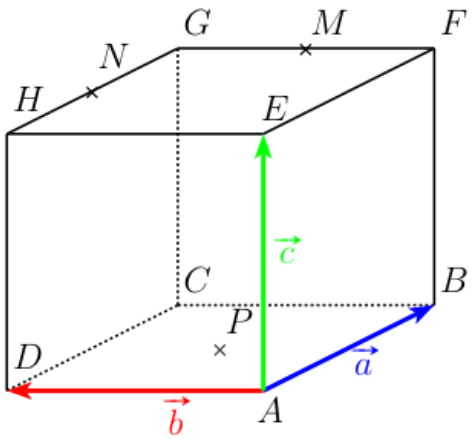
b) $\vec{d} = -\vec{a}-\vec{b}$

c) $\vec{x} = -\frac{1}{2}\vec{c}-5\vec{d} = -\frac{1}{2}(6\vec{a}-2\vec{b})-5(-\vec{a}-\vec{b})$

$= -3\vec{a}+\vec{b}+5\vec{a}+5\vec{b} = 2\vec{a}+6\vec{b}$



Ex 1.1.13



a) $\overrightarrow{EP} = \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b} - \vec{c}$

b) $\overrightarrow{EM} = \vec{a} + \frac{1}{2}\vec{b}$

c) $\overrightarrow{EN} = \frac{1}{2}\vec{a} + \vec{b}$

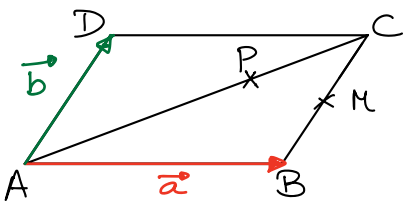
d) $\overrightarrow{NM} = \frac{1}{2}\vec{a} - \frac{1}{2}\vec{b}$

e) $\overrightarrow{PN} = \frac{1}{2}\vec{b} + \vec{c}$

f) $\overrightarrow{NP} = -\frac{1}{2}\vec{b} - \vec{c}$

g) $\overrightarrow{PM} = \frac{1}{2}\vec{a} + \vec{c}$

Ex 1.1.14



$\overrightarrow{PB} = \frac{1}{3}\vec{a} - \frac{2}{3}\vec{b}$

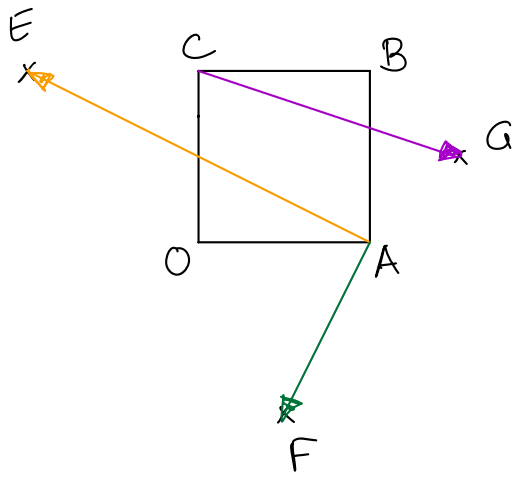
$\overrightarrow{PM} = \frac{1}{3}\vec{a} - \frac{1}{6}\vec{b}$

$\overrightarrow{DM} = \vec{a} - \frac{1}{2}\vec{b}$

Ex 1.1.16

$$2\overrightarrow{CA} - 5\overrightarrow{CB} + 3\overrightarrow{AB} = 2\overrightarrow{CA} + 5\overrightarrow{BC} + 3\overrightarrow{AB}$$
$$= 2\overrightarrow{CA} + 2\overrightarrow{BC} + 3\overrightarrow{BC} + 3\overrightarrow{AB}$$
$$= 2(\overrightarrow{CA} + \overrightarrow{BC}) + 3(\overrightarrow{AB} + \overrightarrow{BC})$$
$$= 2(\overrightarrow{BC} + \overrightarrow{CA}) + 3\overrightarrow{AC}$$
$$= 2\overrightarrow{BA} + 3\overrightarrow{AC}$$
$$= 2\overrightarrow{BA} + 2\overrightarrow{AC} + \overrightarrow{AC}$$
$$= 2(\overrightarrow{BA} + \overrightarrow{AC}) + \overrightarrow{AC} = 2\overrightarrow{BC} + \overrightarrow{AC} \quad \#$$

Ex 1.1.17



$$\overrightarrow{OH} = -\sqrt{2}\,\overrightarrow{OB}$$

$$\Rightarrow \quad \|\overrightarrow{OH}\| = \sqrt{2}\,\|\overrightarrow{OB}\|$$

