

## Question 2

(1) On a :  $\overrightarrow{AC} = \overrightarrow{AD} + \overrightarrow{DC}$ .

Or  $\overrightarrow{AD} = \overrightarrow{DG}$  et  $\overrightarrow{DC} = \overrightarrow{ED}$  (hypothèses).

Donc :

$$\overrightarrow{AC} = \overrightarrow{DG} + \overrightarrow{ED} = \overrightarrow{ED} + \overrightarrow{DG} = \overrightarrow{EG}.$$

Par conséquent  $ACGE$  est un parallélogramme.

(2) Relations de colinéarité :

a)  $\overrightarrow{AM} = \frac{1}{3} \cdot \overrightarrow{MG}$

d)  $\overrightarrow{FB} = -2 \cdot \overrightarrow{AE}$

b)  $\overrightarrow{DQ} = -\frac{1}{2} \cdot \overrightarrow{DB}$

e)  $\overrightarrow{BB} = 0 \cdot \overrightarrow{EN}$

c) impossible car  $\overrightarrow{EM} \not\parallel \overrightarrow{ED}$

f)  $\overrightarrow{DQ} = (-1) \cdot \overrightarrow{DN}$

(3) Calcul des sommes vectorielles :

a)  $\overrightarrow{ED} + \overrightarrow{NA} + \overrightarrow{PD} = \overrightarrow{DC} + \overrightarrow{CN} + \overrightarrow{PD} = \overrightarrow{PD} + \overrightarrow{DC} + \overrightarrow{CN} = \overrightarrow{PN}$

b)  $\overrightarrow{FC} - \overrightarrow{ED} - \overrightarrow{PG} = \overrightarrow{FC} + \overrightarrow{DE} + \overrightarrow{GP} = \overrightarrow{FC} + \overrightarrow{CD} + \overrightarrow{DM} = \overrightarrow{FM}$

c)  $\overrightarrow{CN} + \overrightarrow{QE} + \overrightarrow{FP} = \overrightarrow{CN} + \overrightarrow{NA} + \overrightarrow{PC} = \overrightarrow{PC} + \overrightarrow{CN} + \overrightarrow{NA} = \overrightarrow{PA}$

d)  $\overrightarrow{QD} - \overrightarrow{MA} + \overrightarrow{GQ} = \overrightarrow{GQ} + \overrightarrow{QD} + \overrightarrow{AM} = \overrightarrow{GD} + \overrightarrow{DP} = \overrightarrow{GP}$

## Question 3

(1)  $\overrightarrow{CK} = 2\overrightarrow{AB} + \overrightarrow{AC} = \overrightarrow{AB'} + \overrightarrow{B'D} = \overrightarrow{AD}$  ;

(2)  $\overrightarrow{LA} = 2(\overrightarrow{AC} - \overrightarrow{AB}) = 2(\overrightarrow{AC} + \overrightarrow{BA}) = 2\overrightarrow{BC} = \overrightarrow{BC'}$  ;

(3)  $\overrightarrow{MB} - 3\overrightarrow{MC} = \vec{0}$

$$\Leftrightarrow \overrightarrow{MC} + \overrightarrow{CB} - 3\overrightarrow{MC} = \vec{0}$$

$$\Leftrightarrow -2\overrightarrow{MC} = -\overrightarrow{CB}$$

$$\Leftrightarrow \overrightarrow{CM} = \frac{1}{2}\overrightarrow{BC}$$

(4)  $\overrightarrow{AN} + 2\overrightarrow{BN} + 4\overrightarrow{NC} = 3\overrightarrow{BC}$

$$\Leftrightarrow \overrightarrow{AB} + \overrightarrow{BN} + 2\overrightarrow{BN} + 4\overrightarrow{NB} + 4\overrightarrow{BC} = 3\overrightarrow{BC}$$

$$\Leftrightarrow \overrightarrow{BN} + 2\overrightarrow{BN} - 4\overrightarrow{BN} = 3\overrightarrow{BC} - 4\overrightarrow{BC} - \overrightarrow{AB}$$

$$\Leftrightarrow -\overrightarrow{BN} = -\overrightarrow{BC} - \overrightarrow{AB}$$

$$\Leftrightarrow \overrightarrow{BN} = \overrightarrow{BC} + \overrightarrow{AB}$$

$$\Leftrightarrow \overrightarrow{BN} = \overrightarrow{AC}$$

