

$[G_2G_4]$ $[G_1G_3]$ O G_4 G_3 $G_1G_2G_3G_4$ -(3)
<p style="text-align: right;">:05 •</p> $[AB]$ I O $ABCD$ $\overline{BJ} = \frac{1}{3}\overline{BC}$: $[BC]$ J $(\overline{AB}, \overline{AD})$ \overline{IJ} \overline{BD} -(1) G (IJ) (BD) -(2) J I G -(3) $(A, \overline{AB}, \overline{AD})$ G -(4)
<p style="text-align: right;">:06 •</p> $[AB]$ I B A : M'' M' (P) M $M'' = \text{bar}\{(A,1);(B,1);(M,-1)\}$ $M' = \text{bar}\{(A,-1);(B,1);(M,2)\}$ M' M -(1) M'' M -(2) (C) M M'' M' -(3) I التي مركزها A
<p style="text-align: right;">:07 •</p> (P) C B A M C' B' A' (P) M C B A M' (CC') (BB') (AA') -(1) $ACA'C'$ $BCB'C'$ $ABA'B'$ -(2) M' M f -(3)

<p style="text-align: right;">:01 •</p> $AB = 5$: (P) B A : K G -(1) $K = \text{bar}\{(A,-1);(B,6)\}$ $G = \text{bar}\{(A,2);(B,3)\}$: (P) -(2) $E_1 = \{M \in (P) / \ 2\overline{MA} + 3\overline{MB}\ = 10\}$ $E_2 = \{M \in (P) / \ 2\overline{MA} + 3\overline{MB}\ = \ -\overline{MA} + 6\overline{MB}\ \}$ $E_3 = \{M \in (P) / (2\overline{MA} + 3\overline{MB}) \cdot (-\overline{MA} + 6\overline{MB}) = 0\}$
<p style="text-align: right;">:02 •</p> : (P) K J I ABC $J = \text{bar}\{(A,3);(C,4)\}$ $I = \text{bar}\{(A,3);(B,2)\}$ $K = \text{bar}\{(B,2);(C,-4)\}$ J I K -(1) (IJ) K K J I -(2)
<p style="text-align: right;">:03 •</p> : (P) L H G ABC $L = \text{bar}\{(A,3);(C,1)\}$ $H = \text{bar}\{(A,-2);(B,1)\}$ L H G L H -(1) L H G L H G -(2)
<p style="text-align: right;">:04 •</p> a O $ABCD$: G_2 G_1 -(1) $G_2 = \text{bar}\{(B,3);(C,4)\}$ $G_1 = \text{bar}\{(A,3);(B,4)\}$: G_4 G_3 -(2) $G_4 = \text{bar}\{(D,3);(A,4)\}$ $G_3 = \text{bar}\{(C,3);(D,4)\}$

Séries d'exercices sur la barycentre

:11 •

$AB = a$

M L K H M

(AB) (AC) (BC)

$MH + MK + ML = \frac{a\sqrt{3}}{2}$: - (1)

E (AC) (BC) M - (2)

M F (BC) (AB) M

$ME + MF + MG = a$: G (AB) (AC)

$\vec{j} = \frac{1}{a}\overrightarrow{BA}$ $\vec{i} = \frac{1}{a}\overrightarrow{BC}$: (B, \vec{i}, \vec{j}) (P) - (3)

$\{(A, MF); (B, ME); (C, MG)\}$

M

$M = \text{bar}\{(A, CE), (B, AG); (C, BF)\}$: - (4)

:12 •

$\gamma = AB$ $\beta = AC$ $\alpha = BC$: ABC

C I $[BC]$ \widehat{BAC}

D (AB) (AI)

$\frac{IB}{IC} = \frac{\gamma}{\beta}$: ADC - (1)

$I = \text{bar}\{(B, \beta); (C, \gamma)\}$: - (2)

\widehat{ACB} \widehat{ABC} K J - (3)

(C, γ) (B, β) (A, α) O $[AB]$ $[AC]$

$K = \text{bar}\{(A, \alpha); (B, \beta)\}$ $J = \text{bar}\{(A, \alpha); (C, \gamma)\}$:

O ملاقية في النقطة ABC - (4)

:08 •

$BC = 2$ $AB = AC = 3$: ABC

ABC H $[BC]$ A'

\widehat{BAC} θ $\cos \theta = \frac{7}{9}$: - (1)

B' (AC) B B' - (2)

C A

C B A هي مرجع النقط H - (3)

:09 •

(P) R Q G ABC

$Q = \text{bar}\{(A, 3); (C, 1)\}$ $G = \text{bar}\{(A, 3); (B, 1); (C, 1)\}$

$R = \text{bar}\{(A, 3); (B, 1)\}$

G (CR) (BQ) - (1)

G P A $[BC]$ P - (2)

\overrightarrow{PA} \overrightarrow{PG}

$[BC]$ (C) C B - (3)

(C) A G (Γ)

:10 •

(P) K J I ABC

$K = \text{bar}\{(B, -4); (C, 1)\}$ $J = \text{bar}\{(A, 1); (B, 2)\}$ $I = \text{bar}\{(A, 1); (C, 1)\}$

K J I - (1)

$[CJ]$ $[BI]$ $[AK]$ C' B' A' - (2)

\overrightarrow{AC} \overrightarrow{AB} $\overrightarrow{CC'}$ $\overrightarrow{BB'}$ $\overrightarrow{AA'}$

$(A'C')$ B' C' B' A' - (3)

:15 •
ABCD

- O [CD] [AB] I
- [BD] [AC]
- C J {(A,3);(B,-2)}
- $\overrightarrow{AK} = \frac{1}{4}\overrightarrow{AC}$: K B
- C B J - (1)
- C A K - (2)
- (CI) (BK) (AJ) - (3)
- - (4)
- - (5)
- $E = \left\{ M \in (P) / \left\| 3\overrightarrow{AM} - 2\overrightarrow{BM} \right\| = \left\| -2\overrightarrow{BM} + \overrightarrow{CM} \right\| \right\}$ - (6)
- C A O h
- h B صورة B' أ
- D C I' بين I' = h(I) - ب
- h D صورة D' - ج

:13 •
B A

- k (P)
- $(\Gamma_k) = \left\{ M \in (P) / \frac{MA}{MB} = k \right\}$:
- (Γ_1) - (1)
- $k \in \mathbb{R}_+^* - \{1\}$ - (2)
- (P) J I $(\Gamma_k) = \left\{ M \in (P) / \overrightarrow{MI} \cdot \overrightarrow{MJ} = 0 \right\}$
- $J = \text{bar} \{(A,1);(B,-k)\}$ I = bar {(A,1);(B,k)}
- (Γ_k)
- (3) - تطبيق:**
- $(\Sigma) = \left\{ M \in (P) / 3MA^2 + 2MB^2 = 7MA \times MB \right\}$:
- AB = 4 (P) B A

:14 •
ABCD

- O
- BD = 7cm AC = 6cm AB = 5cm
- $J = \text{bar} \{(B,5);(D,2)\}$ I = bar {(A,3);(C,-1)} : J I
- $D = \text{bar} \{(A,\alpha);(B,\beta);(C,\gamma)\}$: - (1)
- - (2)
- - (3)
- $E_1 = \left\{ M \in (P) / \left\| 3\overrightarrow{MA} - \overrightarrow{MC} \right\| = \left\| \overrightarrow{MB} + \overrightarrow{MD} \right\| \right\}$
- $E_2 = \left\{ M \in (P) / \left\| \overrightarrow{MA} - \overrightarrow{MB} + \overrightarrow{MC} \right\| = \left\| \overrightarrow{AB} + \overrightarrow{AD} \right\| \right\}$
- $\{(A,-6);(B,5);(C,2);(D,2)\}$: K - (4)
- K K J I