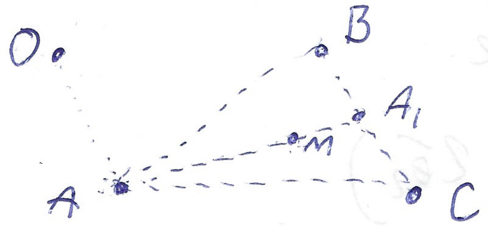
FMA420 2.6




$$\overrightarrow{A_1M} = \frac{1}{3}\overrightarrow{A_1A} \;;\; A_1 = \frac{1}{2}\overline{BC} = \frac{1}{2}\overline{CB}$$

$$\overrightarrow{OM} = \frac{1}{3}\left(\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC}\right)$$

$\cancel{\overrightarrow{OA}\ \overrightarrow{OM} + \overrightarrow{MA}}\ \ \cancel{\overrightarrow{OB} = \overrightarrow{OM}}\ \ \overrightarrow{OA} = \overrightarrow{OB} + \overrightarrow{BA_1} + \overrightarrow{A_1A}$

$\cancel{\overrightarrow{OB}}$

$$\begin{cases} \overrightarrow{OA} = \overrightarrow{OB} + \overrightarrow{BA_1} + \overrightarrow{A_1M} + \overrightarrow{MA} \\ \overrightarrow{OB} = \overrightarrow{OA} + \overrightarrow{AM} + \overrightarrow{MA_1} + \overrightarrow{A_1B} \\ \overrightarrow{OC} = \overrightarrow{OA} + \overrightarrow{AM} + \overrightarrow{MA_1} + \overrightarrow{A_1C} \end{cases}$$

$$\overrightarrow{OM} = \overrightarrow{OA} + \overrightarrow{AB} + \overrightarrow{BA_1} + \overrightarrow{A_1M}$$

Ska visa att $\overrightarrow{OA} + \overrightarrow{AB} + \overrightarrow{BA_1} + \overrightarrow{A_1M} = \frac{1}{3}\left(\overrightarrow{OB} + \overrightarrow{BA_1} + \overrightarrow{A_1M} + \overrightarrow{MA} + \right.$

$\cancel{\overrightarrow{OM} = \overrightarrow{OA} + \frac{2}{3}\overrightarrow{AA_1}}$ $\quad \overrightarrow{OM} = \overrightarrow{OA} + \overrightarrow{AM} = \overrightarrow{OA} + \frac{2}{3}AA_1$

mittpunktsformeln: $\overrightarrow{AA_1} = \frac{1}{2}\left(\overrightarrow{AB} + \overrightarrow{AC}\right)$

$$\overrightarrow{OM} = \overrightarrow{OA} + \frac{1}{2}\cdot\frac{3}{3}\left(\overrightarrow{AB} + \overrightarrow{AC}\right) = \overrightarrow{OA} + \frac{1}{3}\left(\overrightarrow{AB} + \overrightarrow{AC}\right)$$

$$\overrightarrow{AB} = \underbrace{\overrightarrow{AO} + \overrightarrow{OB}}_{\overrightarrow{OB} - \overrightarrow{OA}} \;;\; \overrightarrow{AC} = \underbrace{\overrightarrow{AO} + \overrightarrow{OC}}_{\overrightarrow{OC} - \overrightarrow{OA}}$$

$$\overrightarrow{OM} = \overrightarrow{OA} + \frac{1}{3}\left(\underbrace{\cancel{\overrightarrow{AO} + \overrightarrow{OB} + \overrightarrow{AO} + \overrightarrow{OC}}}_{\overrightarrow{OB} - \overrightarrow{OA} + \overrightarrow{OC} - \overrightarrow{OA}}\right) = \frac{1}{3}\left(\overrightarrow{OB} + \overrightarrow{OC} + \overrightarrow{OA}\right)$$

2.13

Bas $\bar{e}_1, \bar{e}_2$.

a) $u_1 = (3\bar{e}_1, 2\bar{e}_2)$

b) $u_2 = (2, 3)$

c) $u_3 = (-2, 2)$

d) $u_4 = (-3, -2)$

e) $u_5 = (2, -3)$

f) $e_1 = (1, 0)$

g) $e_2 = (0, 1)$

2.14

$$\begin{cases} \hat{u} + \hat{v} = \bar{u} \\ 2\hat{u} + 3\hat{v} = \bar{v} \end{cases} (-2) \Leftrightarrow \begin{array}{l} \hat{u} + \hat{v} = \bar{u} \\ \hat{v} = \bar{v} - 2\bar{u} \end{array}$$

$$\hat{u} = \bar{u} - \hat{v} = \bar{u} - (\bar{v} - 2\bar{u}) = 3\bar{u} - \bar{v}$$

$$\begin{cases} \hat{u} = 3\bar{u} - v \\ \hat{v} = \bar{v} - 2\bar{u} = -2\bar{u} + \hat{v} \end{cases}$$

Koordinater för $\bar{u}$ & $\bar{v}$ i basen $\hat{u}, \hat{v}$?

a) $\bar{u} = (1, 1)$ ; $\bar{v} = (2, 3)$

b) $\hat{u} = (3, -1)$ ; $\hat{v} = (1, -2)$

2.15

$\overline{e}_1 = \overrightarrow{OA}$ ; $\overline{e}_2 = \overrightarrow{OB}$

Koordinater för $\overrightarrow{OC}$ ?

$\overrightarrow{OC} = \frac{3}{4}\overrightarrow{OA} + \frac{1}{4}\overrightarrow{OB}$

$\overrightarrow{OC} = \left(\frac{3}{4}, \frac{1}{4}\right)$