

Ex1

$$\begin{aligned} a) & (-2+i)(2-3i)(-1+i) \\ & = (-4+6i+2i+3)(-1+i) \\ & = (-1+8i)(-1+i) \\ & = 1-i-8i-8 \\ & = -7+9i \quad /2 \end{aligned}$$

$$\begin{aligned} b) & \frac{3-2i}{(2-i)(i+3)} \\ & = \frac{3-2i}{2i+6+1-3i} \\ & = \frac{(3-2i)(7+i)}{(7-i)(7+i)} \\ & = \frac{21+3i-14i+2}{49+1} \\ & = \frac{23}{50} + i \frac{-11}{50} \quad /2 \end{aligned}$$

$$\begin{aligned} c) & \frac{(-1-i)^2}{2-i} \\ & = \frac{1-1+2i}{2-i} \\ & = \frac{2i(2+i)}{(2-i)(2+i)} \\ & = \frac{4i-2}{4+1} \\ & = -\frac{2}{5} + i \frac{4}{5} \quad /2 \end{aligned}$$

$$d) (-i+3)^3 = (3-i)^2(3-i) = (8+6i)(3-i) = 24-8i-18i-6 = -18-26i \quad /2$$

Ex2

$$\begin{aligned} a) & 2z_3 + 3z_2 = 4i - 3 \\ & 2z_3 = -3 + 4i \\ & z_3 = -\frac{3}{2} + \frac{1}{2}i \\ & \mathcal{S} = \left\{ -\frac{3}{2} + \frac{1}{2}i \right\} \quad /1 \end{aligned}$$

$$\begin{aligned} b) & \begin{cases} 3z_1 + 2z_2 = -i \\ 3z_1 - 2z_2 = 5i \quad \times -1 \\ \hline 3z_1 + 2z_2 = -i \quad \times 1 - L_2 \\ \hline -3z_1 + 2z_2 = -5i \end{cases} \\ & \begin{cases} 4z_1 = 4i \\ z_1 = i \\ \hline 3z_2 = \frac{-5i + 3z_1}{2} \\ z_2 = \frac{-5i + 3i}{2} = -i \end{cases} \end{aligned}$$

$$\mathcal{S} = (i; -i) \quad /3$$

Ex3

G barycentre de $\{(A; 2); (B; -3); (C; -1)\}$ avec $2-3-1 = -2 \neq 0$

• Pour tout point M, $-2 \vec{MG} = 2 \vec{MA} - 3 \vec{MB} - \vec{MC}$ ①

• Pour M = B, $\vec{BG} = -\vec{BA} + \frac{1}{2} \vec{BC}$ ①

$$z_G - (-2+i) = - (2i+3 - (-2+i)) + \frac{1}{2} (3-2i - (-2+i)) \quad ①$$

$$z_G = - (2i+3+2-i) + \frac{1}{2} (3-2i+2-i) - 2+i$$

$$z_G = -i - 5 + \frac{5}{2} - \frac{3}{2}i - 2+i$$

$$z_G = \frac{-10+5-4}{2} + i \frac{-2-3+2}{2}$$

$$z_G = -\frac{9}{2} + i \frac{-3}{2} \quad ①$$

$$G \left(-\frac{9}{2} - \frac{3}{2}i \right)$$