1. Localizar vectorialmente los números $z_1 + z_2$ y $z_1 - z_2$, donde

   a) $z_1 = 2\mathrm{i}$, $z_2 = \frac{2}{3} - \mathrm{i}$;

   b) $z_1 = (-3, 1)$, $z_2 = (1, 4)$;

   c) $z_1 = x + \mathrm{i}y$, $z_2 = x_1 - \mathrm{i}y_1$.

2. Verificar que

   a) $\left(\sqrt{2} - \mathrm{i}\right) - \mathrm{i}\left(1 - \sqrt{2}\mathrm{i}\right) = -2\mathrm{i}$.

   b) $\frac{1+2\mathrm{i}}{3-4\mathrm{i}} + \frac{2-\mathrm{i}}{5\mathrm{i}} = -\frac{2}{5}$

   c) $\frac{5\mathrm{i}}{(1-\mathrm{i})(2-\mathrm{i})(3-\mathrm{i})} = -\frac{1}{2}$

   d) $(1 - \mathrm{i})^4 = -4$.

3. Reducir a la forma $x + \mathrm{i}y$:

   a) $(1 - 5\mathrm{i})^2 - 4\mathrm{i}$;

   b) $-\mathrm{i}\,(-1 + \mathrm{i}) + 2$;

   c) $(3 + \mathrm{i})\,(1 - 11\mathrm{i})$;

   d) $(\sqrt{2} - \mathrm{i}\sqrt{5})(\sqrt{5} + \mathrm{i}\sqrt{2})$

   e) $\frac{3-4\mathrm{i}}{2\mathrm{i}}$;

   f) $\frac{2+5\mathrm{i}}{-1+\mathrm{i}\sqrt{3}}$;

   g) $\frac{(2-2\mathrm{i})^2}{1+\mathrm{i}}$;

   h) $\frac{z-\bar{z}\mathrm{i}}{\bar{z}-z\mathrm{i}}$

4. Probar que

   a) $\mathrm{Re}(\mathrm{i}z) = -\mathrm{Im}(z)$;

   b) $(1 + z)^2 = 1 + 2z + z^2$;

   c) Si $z_1 z_2 = 0$, entonces $z_1 = 0$ o $z_2 = 0$;

   d) $z_1 - z_2 = \bar{z}_1 - \bar{z}_2$;

   e) $z_1 z_2 = \bar{z}_1 \bar{z}_2$;

   f) $\omega = \frac{1}{2}\left(-1 - \sqrt{3}\mathrm{i}\right)$ satisface

      1) $\omega^2 + \omega + 1 = 0$;

      2) $\omega^3 = 1$.