TS 1 **Interrogation** **Eléments de correction**

Exercice 1 :

a. $z_1+z_2=1+2i+(-3+4i)=1+2i-3+4i=-2+6i$

b. $z_1z_2=(1+2i)(-3+4i)=-3+4i-6i+8i^2=-3-2i-8=-11-2i$

c. $4z_1-iz_2=4(1+2i)-i(-3+4i)=4+8i+3i+4=8+11i$

d. $\dfrac{z_2}{z_1}=\dfrac{(-3+4i)\times(1-2i)}{(1+2i)\times(1-2i)}=\dfrac{-3+6i+4i-8i^2}{1^2+2^2}=\dfrac{5+10i}{5}=1+2i$

e. $(z_1)^2=(1+2i)^2=1+4i+4i^2=-3+4i$

f. $\dfrac{z_1-6i}{z_2+5-6i}=\dfrac{(1-4i)\times(2+2i)}{(2-2i)\times(2+2i)}=\dfrac{2+2i-8i-8i^2}{2^2+2^2}=\dfrac{10-6i}{8}=\dfrac{5-3i}{4}$

Exercice 2

1. $\overline{z}=\overline{(1-2i)(3+i)-5+4i}=(1+2i)(3-i)-5-4i$

2. $\overline{z}=(1+2i)(3-i)-5-4i=3-i+6i-2i^2-5-4i=i$

3.

Exercice 3

a)

$$2z-i=3iz-2\Leftrightarrow 2z-3iz=i-2\Leftrightarrow(2-3i)z=i-2$$

$$\Leftrightarrow z=\frac{i-2}{2-3i}=\ldots=\frac{-7-4i}{13}$$

b)

$$i\overline{z}-4=2i-3\overline{z}\Leftrightarrow i\overline{z}+3\overline{z}=2i+4\Leftrightarrow(i+3)\overline{z}=2i+4$$

$$\Leftrightarrow \overline{z}=\frac{2i+4}{i+3}=\ldots=\frac{7+i}{5}$$

Donc $z=\dfrac{7-i}{5}$

c)

$$(2+i)\overline{z}=4z-6i\Leftrightarrow(2+i)(a-ib)=4(a+ib)-6i$$

$$\Leftrightarrow 2a-2ib+ia+b=4a+4ib-6i$$

$$\Leftrightarrow \underbrace{2a+b}_{X}\underbrace{+i(a-2b)}_{+iY}=\underbrace{4a}_{X'}\underbrace{+i(-6+4b)}_{+iY'}$$

$$\Leftrightarrow\begin{cases}2a+b=4a\\ a-2b=-6+4b\end{cases}\Leftrightarrow\begin{cases}b=2a\\ a-12a=-6\end{cases}\Leftrightarrow\begin{cases}b=\dfrac{12}{11}\\ a=\dfrac{6}{11}\end{cases}$$

Donc $S=\left\{\dfrac{6}{11}+\dfrac{12}{11}i\right\}$

d) $\Delta=-4<0$ donc 2 solutions complexes $z_1=\dfrac{2+2i}{2}=1+i$ et

$z_2=\dfrac{2-2i}{2}=1-i$