

## Résolution d'équations avec les complexes.

Ex 30

1°)  $7z - 1 = 7i$

$\Leftrightarrow 7z = 1 + 7i$

$\Leftrightarrow z = \frac{1+i}{7} \quad S = \left\{ \frac{1+i}{7} \right\}$

2°)  $5z + 5 = 2z + 3 + 2i$

$\Leftrightarrow 5z - 2z = 3 + 2i - 5$

$\Leftrightarrow 3z = -2 + 2i$

$\Leftrightarrow z = -\frac{2}{3} + \frac{2i}{3} \quad S = \left\{ -\frac{2}{3} + \frac{2i}{3} \right\}$

3°)  $(4+z)(5+z) = 4i + z^2$

$\Leftrightarrow 20 + 4z + 5z + z^2 = 4i + z^2$

$\Leftrightarrow 9z = -20 + 4i$

$\Leftrightarrow z = \frac{-20+4i}{9} = -\frac{20}{9} + \frac{4}{9}i \quad S = \left\{ -\frac{20}{9} + \frac{4}{9}i \right\}$

4°)  $2 + iz = (5+i)(z+3)$

$\Leftrightarrow 2 + iz = 5z + 15 + iz + 3i$

$\Leftrightarrow 2 = 5z + 15 + 3i$

$\Leftrightarrow -13 - 3i = 5z$

$\Leftrightarrow -\frac{13}{5} - \frac{3i}{5} = z \quad S = \left\{ -\frac{13}{5} - \frac{3i}{5} \right\}$

Ex 31:

1°)  $iz - 1 = 7i + z$

$\Leftrightarrow iz - z = 7i + 1$

$\Leftrightarrow (-1+i)z = 1+7i$

$\Leftrightarrow z = \frac{1+7i}{-1+i} = \frac{(1+7i)(-1-i)}{(-1)^2 + 1}$   
 $= \frac{-1-i-7i-7i^2}{2} = \frac{3-8i}{2}$

$$2^{\circ}) 5z + 5 = iz + 3 + 2i$$

$$\Leftrightarrow 5z - iz = -2 + 2i$$

$$\Leftrightarrow (5 - i)z = -2 + 2i$$

$$\Leftrightarrow z = \frac{-2 + 2i}{5 - i} = \frac{(-2 + 2i)(5 + i)}{5^2 + (-1)^2}$$

$$= \frac{-10 - 2i + 10i + 2i^2}{26} = \frac{-12 + 8i}{26}$$

$$= -\frac{6}{13} + \frac{4}{13}i \quad S = \left\{ -\frac{6}{13} + \frac{4}{13}i \right\}$$

$$3^{\circ}) 4iz + 2i = 1 - z + i$$

$$\Leftrightarrow 4iz + z = 1 - i$$

$$\Leftrightarrow (4i + 1)z = 1 - i$$

$$\Leftrightarrow z = \frac{1 - i}{1 + 4i} = \frac{(1 - i)(1 - 4i)}{1^2 + 4^2} = \frac{1 - 4i - i + 4i^2}{17}$$

$$= \frac{-3 - 5i}{17} \quad S = \left\{ -\frac{3}{17} - \frac{5}{17}i \right\}$$

$$4^{\circ}) \frac{z}{1+i} + 3 = \frac{z}{1-i} - 3$$

$$\Leftrightarrow \frac{z}{1+i} - \frac{z}{1-i} = -6$$

$$\Leftrightarrow \frac{z(1-i) - z(1+i)}{(1+i)(1-i)} = -6$$

$$\Leftrightarrow \frac{z((1-i) - (1+i))}{1^2 + 1^2} = -6$$

$$\Leftrightarrow \frac{-2iz}{2} = -6$$

$$\Leftrightarrow -iz = -6$$

$$\Leftrightarrow z = \frac{-6}{-i} = \frac{-6 \times i}{0^2 + (-1)^2} = -6i \quad S = \{-6i\}$$