

$$(15) z^2 - 5z + 9 = 0$$

$$\Delta = 25 - 36 = -11 = (\sqrt{11}i)^2$$

$$z = \frac{5 \pm i\sqrt{11}}{2}$$

$$\bullet 2z^2 - 3z + 3 - i = 0 \quad \Delta = 9 - 8(3-i) = 9 - 24 + 8i = -15 + 8i$$

On cherche $s = a + ib$ tel que $(a + ib)^2 = -15 + 8i$ car $a^2 - b^2 + i2ab = -15 + 8i$

$$\text{module de } s^2 \begin{cases} a^2 - b^2 = -15 \\ 2ab = 8 \\ a^2 + b^2 = \sqrt{15^2 + 8^2} = \sqrt{225 + 64} = \sqrt{289} = 17 \end{cases}$$

$$4, +4: 2a^2 = 8 \quad a^2 = 1 \\ a = \pm 1$$

$$\text{avec } \begin{cases} a = 1 \\ 2ab = 8 \end{cases} \Rightarrow b = 4$$

$$\text{avec } a = -1: b = -4$$

$$s = \pm (1 + 4i) \quad (= \sqrt{\Delta})$$

$$z = \frac{3 \pm (1 + 4i)}{4} = \begin{cases} \frac{4 + 4i}{4} = 1 + i \\ \frac{2 - 4i}{4} = \frac{1}{2} - i \end{cases}$$

$$\bullet z^2 - (1 - 2i)z + 1 - 7i = 0 \quad \Delta = (1 - 2i)^2 - 4(1 - 7i) = 1 - 4i - 4 - 4 + 28i = -7 + 24i$$

On cherche $s = a + ib$ tel que $(a + ib)^2 = -7 + 24i = a^2 - b^2 + i2ab$

$$|s|^2 \begin{cases} a^2 - b^2 = -7 \\ 2ab = 24 \\ a^2 + b^2 = \sqrt{7^2 + 24^2} = \sqrt{49 + 576} = \sqrt{625} = 25 \end{cases}$$

$$4, +4: 2a^2 = 18 \Rightarrow a^2 = 9$$

$$a = \pm 3$$

$$\text{avec } \begin{cases} a = 3 \\ 2ab = 24 \end{cases} \Rightarrow b = \frac{24}{6} = 4$$

$$s = \pm (3 + 4i)$$

$$z = \frac{1 - 2i \pm (3 + 4i)}{2} = \begin{cases} \frac{4 + 2i}{2} = 2 + i \\ \text{ou} \\ \frac{-2 - 6i}{2} = -1 - 3i \end{cases}$$