

Complexe getallen

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$$1. \frac{1-i}{1+i} = \begin{cases} \frac{1-i}{1+i} \cdot \frac{1-i}{1-i} = \frac{-2i}{2} = -i \\ \frac{\sqrt{2} \cdot e^{-\frac{\pi}{4}i}}{\sqrt{2} \cdot e^{\frac{1}{4}\pi i}} = e^{-\frac{1}{2}\pi i} = -i \end{cases}$$

$$2. (-1+i) \cdot (-1+i) = \begin{cases} 1-1-2i = -2i \\ \sqrt{2} \cdot e^{\frac{3}{4}\pi i} \cdot \sqrt{2} \cdot e^{\frac{3}{4}\pi i} = 2 \cdot e^{\frac{1}{2}\pi i} = 2 \cdot -i = -2i \end{cases}$$

$$3. \frac{i}{-1-i} = \begin{cases} \frac{i}{-1-i} \cdot \frac{-1+i}{-1+i} = \frac{-i-1}{2} = -\frac{1}{2} - \frac{1}{2}i \\ \frac{e^{\frac{\pi}{2}i}}{\sqrt{2} \cdot e^{-\frac{3}{4}\pi i}} = \frac{1}{\sqrt{2}} \cdot e^{\frac{1}{4}\pi i} = \frac{1}{\sqrt{2}} \cdot \left(-\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}i\right) = -\frac{1}{2} - \frac{1}{2}i \end{cases}$$

$$4. (\sqrt{3}+i) \cdot (-\sqrt{3}+i) = \begin{cases} -3-1 = -4 \\ 2 \cdot e^{\frac{1}{6}\pi i} \cdot 2 \cdot e^{\frac{5}{6}\pi i} = 4 \cdot e^{\pi i} = 4 \cdot -1 = -4 \end{cases}$$

$$5. (-1+i) \cdot (2i) = \begin{cases} = -2i - 2 \\ \sqrt{2} \cdot e^{\frac{3}{4}\pi i} \cdot 2 \cdot e^{\frac{1}{2}\pi i} = 2\sqrt{2} \cdot e^{\frac{1}{4}\pi i} = 2\sqrt{2} \cdot \left(-\frac{1}{2}\sqrt{2} - \frac{1}{2}\sqrt{2}i\right) = -2 - 2i \end{cases}$$

$$6. \frac{1}{1-i\sqrt{3}} = \begin{cases} \frac{1}{1-i\sqrt{3}} \cdot \frac{1+i\sqrt{3}}{1+i\sqrt{3}} = \frac{2+2i\sqrt{3}}{4} = \frac{1}{2} + \frac{1}{2}i\sqrt{3} \\ \frac{e^{0i}}{2 \cdot e^{-\frac{1}{3}\pi i}} = \frac{1}{2} e^{\frac{1}{3}\pi i} = \frac{1}{2} (1+i\sqrt{3}) \end{cases}$$

$$7. (-3+3i) \cdot (-2+2i) = \begin{cases} 6-6-12i = -12i \\ 3\sqrt{2} \cdot e^{\frac{3}{4}\pi i} \cdot 2\sqrt{2} \cdot e^{\frac{3}{4}\pi i} = 12 \cdot e^{\frac{1}{2}\pi i} = 12 \cdot (-i) \end{cases}$$

$$8. \frac{2}{\sqrt{3}-i} = \begin{cases} \frac{2}{\sqrt{3}-i} \cdot \frac{\sqrt{3}+i}{\sqrt{3}+i} = \frac{2\sqrt{3}+2i}{4} = \frac{1}{2}\sqrt{3} + \frac{1}{2}i \\ \frac{2 \cdot e^{0i}}{2 \cdot e^{-\frac{1}{6}\pi i}} = e^{\frac{1}{6}\pi i} = \frac{1}{2} \cdot \sqrt{3} + \frac{1}{2}i \end{cases}$$

$$9. (-3+3i).(1+i) = \begin{cases} -3-3i+3i-3 = -6 \\ 3\sqrt{2}.e^{\frac{3}{4}\pi i} \cdot \sqrt{2}.e^{\frac{1}{4}\pi i} = 6.e^{\pi i} = -6 \end{cases}$$

$$10. \frac{2+2i}{1-i} = \begin{cases} \frac{2+2i}{1-i} \cdot \frac{1+i}{1+i} = \frac{2-2+4i}{2} = 2i \\ \frac{2\sqrt{2}.e^{\frac{1}{4}\pi i}}{\sqrt{2}.e^{-\frac{1}{4}\pi i}} = 2.e^{\frac{1}{2}\pi i} = 2i \end{cases}$$