

Übungen zu komplexen Zahlen

1) a) $\frac{1+i}{i} - \frac{4}{2+i} =$ b) $\frac{2+2i}{1-i} + \frac{2}{2-i} =$ c) $\frac{2+2i}{i} - \frac{3-2i}{1+i} =$ d) $\frac{4-2i}{1-i} + \frac{1-2i}{1-i} =$
 [a) $- \frac{3}{5} - \frac{1}{5}i$, b) $\frac{4}{5} + \frac{12}{5}i$, c) $\frac{3}{2} + \frac{1}{2}i$, d) $\frac{9}{2} + \frac{1}{2}i$]

2) a) $i^3 \cdot x + 4 - i = x$ b) $(1+i) \cdot i^3 \cdot x - i = 1 - ix$ c) $x \cdot i^2 - i \cdot x = 1 - (2+i) \cdot x$
 [a) $\frac{3}{2} - \frac{5}{2}i$, b) $1+i$, c) 1]

3) a) $x^2 + 4x + 9 = 0$ b) $x^2 + 2x + 5 = 0$ c) $2x^2 + 3x + 4 = 0$ d) $x^4 + 4x^2 + 4 = 0$
 [a) $-2 \pm \sqrt{5}i$, b) $-1 \pm 2i$, c) $-\frac{3}{4} \pm \sqrt{23}/4 i$, d) $\pm \sqrt{2}i$]

4) a) $(1-i) \cdot x^2 + 1+i = 2x^2$ b) $(1+i) \cdot x^2 - 1+i = 2x^2$
 [a) ± 1 , b) $\pm i$]

5) a) $\frac{1+2i}{x} = 2-i$ b) $\frac{1+2i}{x-1} = 2-i$ c) $\frac{2-2i}{x+2} = 2$ d) $\frac{1+3i}{x} = \frac{i}{x-1}$
 [a) i , b) $1+i$, c) $-1-i$, d) $-\frac{7}{5} + \frac{1}{5}i$]

6) a) $x + ix - 2 - i = 4 - ix + 2(4-i)$ b) $3x + ix - 2 + i = 4 - ix + 2(5-i)$
 [a) $\frac{12}{5} - \frac{29}{5}i$, b) $\frac{42}{13} - \frac{41}{13}i$]

7) a) $\frac{1}{2-i} \cdot x - \frac{3+i}{i} = ix$ b) $x + 2ix = \frac{ix}{2-i} + 1-i$ c) $\frac{ix}{1+i} + 3-2i = 2x + 2ix$

d) $x + 3ix = \frac{i}{1-i} \cdot x + 2+i$ [a) $\frac{7}{2} - \frac{1}{2}i$, b) $-\frac{1}{10} - \frac{7}{10}i$, c) $\frac{1}{3} - \frac{5}{3}i$, d) $\frac{11}{17} - \frac{7}{17}i$]