

# Arithmetik – Algebraische Gleichungen höheren Grades

Lösungsblatt 2

Lösen Sie folgende Gleichungen über die Grundmenge die  $G = C$  durch Abspalten!

$s^4 - 10s^3 + 35s^2 - 50s + 24 = 0 \rightarrow \underline{s_1 = +1}$ $(s^4 - 10s^3 + 35s^2 - 50s + 24) : (s - 1) = \underline{s^3 - 9s^2 + 26s - 24}$ $\pm s^4 \mp s^3$ <hr/> $\begin{array}{r} -9s^3 + 35s^2 - 50s \\ \mp 9s^3 \pm 9s^2 \\ \hline +26s^2 - 50s + 24 \\ \pm 26s^2 \mp 26s \\ \hline -24s + 24 \\ \mp 24s \pm 24 \\ \hline 0 \quad 0 \end{array}$	$s^3 - 9s^2 + 26s - 24 = 0 \rightarrow \underline{s_2 = +2}$ $(s^3 - 9s^2 + 26s - 24) : (s - 2) = \underline{s^2 - 7s + 12}$ $\pm s^3 \mp 2s^2$ <hr/> $\begin{array}{r} -7s^2 + 26s - 24 \\ \mp 7s^2 \pm 14s \\ \hline +12s - 24 \\ \pm 12s \mp 24 \\ \hline 0 \quad 0 \end{array}$ $s^2 - 7s + 12 = 0$ $s_{3,4} = \frac{7}{2} \pm \sqrt{\left(\frac{7}{2}\right)^2 - 12}; \rightarrow s_{3,4} = \frac{7}{2} \pm \sqrt{\frac{49}{4} - \frac{48}{4}}$ $s_{3,4} = \frac{7}{2} \pm \frac{1}{2};$ <p style="text-align: right;"><b><u><math>s_3 = +4; s_4 = +3;</math></u></b> <b><u><math>L = \{+1, +2, +3, +4\}</math></u></b></p>
$n^4 + 5n^3 - 20n - 16 = 0 \rightarrow \underline{n_1 = +2}$ $(n^4 + 5n^3 - 20n - 16) : (n - 2) = \underline{n^3 + 7n^2 + 14n + 8}$ $\pm n^4 \mp 2n^3$ <hr/> $\begin{array}{r} +7n^3 \quad -20n \\ \pm 7n^3 \mp 14n^2 \\ \hline +14n^2 - 20n - 16 \\ \pm 14n^2 \mp 28n \\ \hline +8n - 16 \\ \pm 8n \mp 16 \\ \hline 0 \quad 0 \end{array}$	$n^3 + 7n^2 + 14n + 8 = 0 \rightarrow \underline{n_2 = -1}$ $(n^3 + 7n^2 + 14n + 8) : (n + 1) = \underline{n^2 + 6n + 8}$ $\pm n^3 \pm n^2$ <hr/> $\begin{array}{r} +6n^2 + 14n + 8 \\ \pm 6n^2 \pm 6n \\ \hline +8n + 8 \\ \pm 8n \pm 8 \\ \hline 0 \quad 0 \end{array}$ $n^2 + 6n + 8 = 0$ $s_{3,4} = -\frac{6}{2} \pm \sqrt{\left(\frac{6}{2}\right)^2 - 8}; \rightarrow s_{3,4} = -3 \pm \sqrt{9 - 8}$ $s_{3,4} = -3 \pm 1;$ <p style="text-align: right;"><b><u><math>s_3 = -2; s_4 = -4;</math></u></b> <b><u><math>L = \{-4, -2, -1, +2\}</math></u></b></p>