

Kvadratkompletierung

$$(x+b)^2 = x^2 + 2bx + b^2 \quad \text{Kvadratierungsformel}$$

$$\left(x + \frac{p}{2}\right)^2 = x^2 + px + \left(\frac{p}{2}\right)^2 \quad (\text{Speziell})$$

Für $x^2 + px = \left(x + \frac{p}{2}\right)^2 - \left(\frac{p}{2}\right)^2$ kv. kompl

Ex: $\underbrace{x^2 + 3x}_{p=3} + 2 = \left(x + \frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)^2 + 2$

$$= \left(x + \frac{3}{2}\right)^2 - \frac{9}{4} + \frac{8}{4} = \left(x + \frac{3}{2}\right)^2 - \frac{1}{4}$$

Nullost $x^2 + 3x + 2 = 0$

$$\Leftrightarrow \left(x + \frac{3}{2}\right)^2 - \frac{1}{4} = 0 \Leftrightarrow \left(x + \frac{3}{2}\right)^2 = \frac{1}{4}$$

$$\Leftrightarrow x + \frac{3}{2} = \pm \sqrt{\frac{1}{4}}$$

$$\Leftrightarrow x = -\frac{3}{2} \pm \frac{1}{2} \quad (\Leftrightarrow)$$

$$\Leftrightarrow x = -\frac{3}{2} + \frac{1}{2} = -\frac{2}{2} = -1$$

$$\cup x = -\frac{3}{2} - \frac{1}{2} = -\frac{4}{2} = -2$$

So $x^2 + 3x + 2 = (x+1)(x+2)$

Pq-Formeln

$$x^2 + px + q = 0$$

$$\Leftrightarrow x = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q} \quad \text{om } \left(\frac{p}{2}\right)^2 - q \geq 0$$

Da \bar{a}_1

$$x^2 + px + q = (x - a_1)(x - a_2)$$

om a_1, a_2 \bar{a}_1 nullost.