

$$\begin{aligned}
y &= x^2 + bx + c \\
&= x^2 + 2 \cdot \frac{b}{2}x + c \\
&= \underbrace{x^2 + 2 \cdot \frac{b}{2}x + \left(\frac{b}{2}\right)^2}_{\left(x + \frac{b}{2}\right)^2} - \left(\frac{b}{2}\right)^2 + c \\
&= \left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c \quad \left| + \left(\frac{b}{2}\right)^2 - c \right. \\
y + \left(\frac{b}{2}\right)^2 - c &= \left(x + \frac{b}{2}\right)^2 \quad \left| \text{(Scheitelpunktform)} \right. \\
y - y_S &= (x - x_S)^2 \\
S(x_S; y_S) &\text{ bzw. } S\left(-\frac{b}{2}; \left(\frac{b}{2}\right)^2 - c\right)
\end{aligned}$$

(1)