Nullstellen:

1. lineare Funktion (gerade)

$$f(x) = 3x - 12$$

Nullstelle (x-Achsenschnittpunkt)

setze $3x - 12 = 0 \quad | +12$

$3x = 12 \quad | :3$

$x = 4$

$N(4|0)$

2. quadratische Funktion (Parabel)

$$f(x) = \frac{1}{4}x^2 - 1{,}5x - 4$$

setze $f(x) = 0$

$\frac{1}{4}x^2 - 1{,}5x - 4 = 0 \quad | : \frac{1}{4}$

$x^2 - 6x - 16 = 0 \quad | p = -6 \quad q = -16$

$x_{1/2} = -\frac{-6}{2} \pm \sqrt{\left(\frac{6}{2}\right)^2 + 16} = 3 \pm \sqrt{9+16} = 3 \pm \sqrt{25} = 3 \pm 5$

$x_1 = 8 \quad x_2 = -2$

$x^2 - 8x + 15 = 0$

$x_{1/2} = 4 \pm \sqrt{16 - 15} = 4 \pm 1$

$x_1 = 5 \quad x_2 = 3$

$x^2 - 12x + 11 = 0$

$x_{1/2} = 6 \pm \sqrt{36 - 11} = 6 \pm \sqrt{25} = 6 \pm 5$

$x_1 = 11 \quad x_2 = 1$

3. Funktionen 3. Grades

$f(x) = x^3 + 6x^2 + 5x$

setze $f(x) = 0$

$x^3 + 6x^2 + 5x = 0$

erste Nullstelle: $x_1 = 0$

denn $0^3 + 6 \cdot 0^2 + 5 \cdot 0 = 0$

$x(x^2 + 6x + 5) = 0$

$x_1 = 0 \qquad x_{2/3} \rightarrow x^2 + 6x + 5 = 0 \quad | p = 6 \quad q = 5$

$x_{2/3} = -3 \pm \sqrt{9 - 5} = -3 \pm \sqrt{4} = -3 \pm 2$

$x_2 = -1 \quad x_3 = -5 \quad N_1(0|0) \; N_2(-1|0) \; N_3(-5|0)$

Probe $x = -1 \quad -1 \cdot ((-1)^2 + 6 \cdot (-1) + 5) = -1 \cdot ($

Finde die Nullstellen:

$x_{1/2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$

a) $f(x) = x^3 - 2x^2 - 3x$

b) $f(x) = \frac{1}{2}x^3 + \frac{1}{2}x^2 - 10x$

c) $f(x) = \frac{1}{6}x^3 - 2x^2 + 3x$

d) $f(x) = 2x^3 + 8x^2 - 24x$

erster Schritt	$: \frac{1}{2}$
	$: \frac{1}{6}$

$(x+5)(x-1) = x^2 + 4x - 20$

$1 \cdot (-6) \cdot 5) = -1 \cdot 0$