Berechne die Nullstellen

$f(x) = x^2 - 3x - 4$

$x^2 - 3x - 4 = 0 \qquad => \qquad (x - 4)(x + 1) = 0$

$\qquad\qquad\qquad\qquad \Rightarrow x_1 = 4 \qquad \wedge \qquad x_2 = -1$

$f(x) = x^2 + 2x - 5$

$x^2 + 2x - 5 = 0 \qquad p = 2 \quad q = -5$

$$\Rightarrow x_{1,2} = -\frac{2}{2} \pm \sqrt{\left(\frac{2}{2}\right)^2 - (-5)} = -1 \pm \sqrt{6}$$

$$f(x) = \frac{x^3 - 4x^2 + 4x}{x - 1}$$

$\frac{x^3 - 4x^2 + 4x}{x - 1} = 0 \qquad => \qquad x^3 - 4x^2 + 4x = 0$

$\qquad\qquad\qquad \Rightarrow x(x^2 - 4x + 4) = 0$

$\qquad\qquad\qquad \Rightarrow x(x - 2)^2 = 0$

$\qquad\qquad\qquad \Rightarrow x_1 = 0 \wedge x_2 = 2$

$f(x) = 5x\, e^x$

$5x\, e^x = 0 \qquad => \qquad 5x = 0 \qquad => \qquad x = 0$

$f(x) = \sin(2x)$

$\sin(2x) = 0 \qquad => \qquad 2x = n\pi \qquad => x = \frac{1}{2} n\pi$