Kurven Aufgabe 38

$\mathbf{f_{(x)} = (x^2 - x - 6) * (x - 1) = x^3 - 2x^2 - 5x + 6}$

$f'_{(x)} = 3x^2 - 4x - 5$, $f''_{(x)} = 6x - 4$, $f'''_{(x)} = 6$

Definitionsbereich: $\mathbf{- \infty < x < \infty}$

Wertebereich: $\mathbf{- \infty < f_{(x)} < \infty}$

Asymptoten: -

Symmetrie: -

Nullstellen:

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

Durch Probieren gefunden x = 1.

Hornerschema:

	1	-2	-5	6
$x_1 = 1$		1	-1	-6
	1	-1	-6	0

Polynomdivision:

$$
\begin{array}{l}
x^3 - 2x^2 - 5x + 6 : (x - 1) = x^2 - x - 6 \\
-(x^3 - x^2) \\
\hline
\qquad -x^2 - 5x + 6 \\
\qquad -(-x^2 + x) \\
\hline
\qquad\qquad -6x + 6 \\
\qquad\qquad -(-6x + 6) \\
\hline
\qquad\qquad\qquad 0
\end{array}
$$

$x^2 - x - 6 = 0$

p, q - Formel:

$p = - 1, q = - 6$

$$x_{2,3} = \frac{-(-1)}{2} \pm \sqrt{\left(\frac{-1}{2}\right)^2 - (-6)}$$

$$x_{2,3} = 0{,}5 \pm \sqrt{6{,}25}$$

$x_{2,3} = 0{,}5 \pm 2{,}5$

$x_2 = 3$

$x_3 = -2$ **$N_1(1|0)$, $N_2(3|0)$, $N_3(-2|0)$**

Schnittpunkt mit der y-Achse:

$f_{(0)} = 0^3 - 2 * 0^2 - 5 * 0 + 6 = 6$

$S_y(0|6)$

Extrempunkte:

$3x^2 - 4x - 5 = 0$

A, B, C - Formel:

A = 3, B = - 4, C = - 5

$$x_{1,2} = \frac{-(-4) \pm \sqrt{(-4)^2 - 4*3*(-5)}}{2*3} = \frac{4 \pm \sqrt{76}}{6}$$

$$x_{1,2} = \frac{4 \pm 8{,}72}{6}$$

$x_1 = 2{,}12$, $f_{(2,12)} = (2{,}12)^3 - 2 * (2{,}12)^2 - 5 * (2{,}12) + 6 = -4{,}06$

$x_2 = -0{,}79$, $f_{(-0,79)} = (-0{,}79)^3 - 2 * 8-0{,}79)^2 - 5 * (-0{,}79) + 6 = 8{,}21$

$f''_{(2,16)} = 6 * 2{,}12 - 4 > 0$ --> **Tiefpunkt (2,12|-4,06)**

$f''_{(-0,79)} = 6 * (-0{,}79) - 4 < 0$ --> **Hochpunkt (-0,79|8,21)**

Wendepunkte:

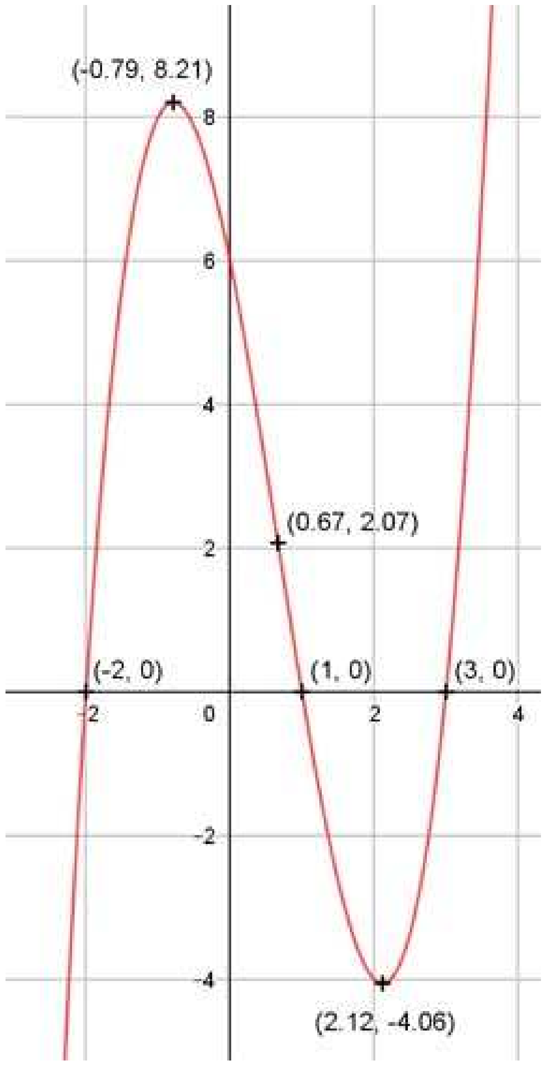
$6x - 4 = 0 \quad |+4$

$6x = 4 \quad | :6$

$x = 2/3$, $f_{(2/3)} = (2/3)^3 - 2 * (2/3)^2 - 5 * (2/3) + 6 = 2{,}07$, $f'''_{(2/3)} \neq 0$

--> **Wendepunkt (2/3|2,07)**

Graph:



(-0.79, 8.21)
(0.67, 2.07)
(-2, 0)
(1, 0)
(3, 0)
(2.12, -4.06)
8
6
4
2
0
-2
-4
-2
2
4