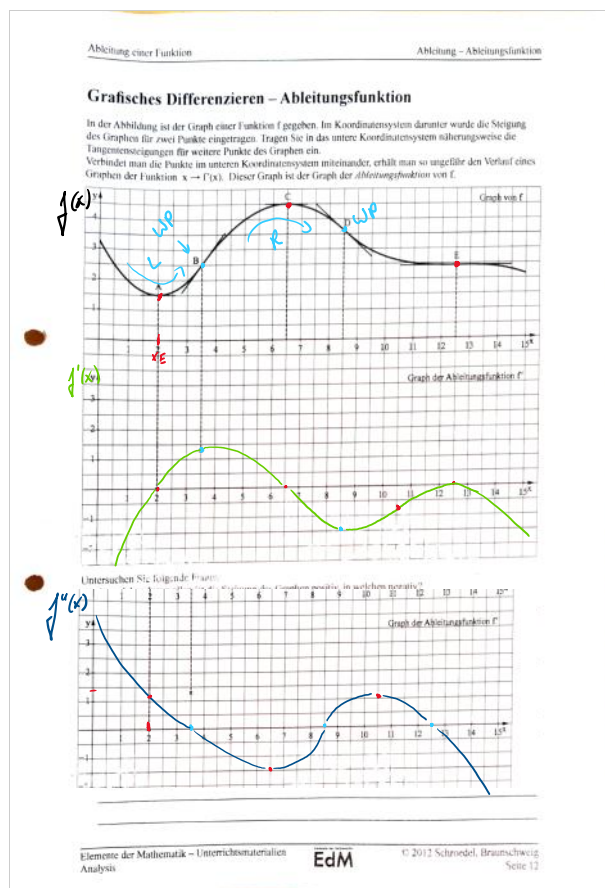




$$f(x) = y$$

$$f'(x) = m$$

Nullstellen: $f'(x) \stackrel{!}{=} 0$
von $f(x)$

Extrema: $f'(x) \stackrel{!}{=} 0$
von $f(x)$

Wendestellen: $f''(x) \stackrel{!}{=} 0$
von $f(x)$

Extremstellen:
 $f'(x) \stackrel{!}{=} 0$
 $\xrightarrow{\text{CAS}} x_E =$

ist x_E in HP oder TP?

$f''(x_E) < 0 \rightarrow \text{HP}$
 $f''(x_E) > 0 \rightarrow \text{TP}$

Wendestelle:

$f''(x) \stackrel{!}{=} 0$
 $\xrightarrow{\text{CAS}} x_W =$

$f'''(x_W) < 0 \rightarrow \text{LR}$
 $f'''(x_W) > 0 \rightarrow \text{RL}$

Symmetrie:

Achsens. $\rightarrow f(-x) = f(x) \rightarrow$ alle Exponenten gerade
Punkts. $\rightarrow f(-x) = -f(x) \rightarrow$ alle Exponenten ungerade

voll. Kurvenuntersuchung:

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

NS: $f'(x) \stackrel{!}{=} 0$

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

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

$x_1 = 0$ $\frac{2}{3}x^2 - 4x + \frac{1}{2} = 0$ | pq-Formel...
 $x_2 =$

ES: $f'(x) = 0$

$$0 = 2x^2 - 8x + \frac{1}{2} \quad | \text{pq-Formel...}$$

$\xrightarrow{\text{CAS}} x_1 = 0,064; x_2 = 3,94$

$f''(x) = 4x - 8$

$f''(x_1 = 0,064) = 4 \cdot 0,064 - 8 = -7,74 < 0 \Rightarrow \text{HP}$

$f''(x_2 = 3,94) = 4 \cdot 3,94 - 8 = 7,76 > 0 \Rightarrow \text{TP}$

WS: $f''(x) \stackrel{!}{=} 0$

$$0 = 4x - 8 \quad | +8$$

$$8 = 4x \quad | :4$$

$$2 = x$$

$f'''(x) = 4$

$f'''(x=2) = 4 > 0 \Rightarrow \text{RL}$

