

## Lösungen zu den Übungsaufgaben GW von Funktionen an einer Stelle $x_0$

1.) a) Definitionslücke:  $x = 2$

$$\lim_{x \rightarrow 2^{(+)}} \frac{5x+4}{x-2} = \underline{\underline{+\infty}}$$

$$\lim_{x \rightarrow 2^{(-)}} \frac{5x+4}{x-2} = \underline{\underline{-\infty}}$$

b.) Definitionslücke:  $x = -3$

$$\lim_{x \rightarrow -3^{(+)}} \frac{2x^2+1}{x+3} = \underline{\underline{+\infty}}$$

$$\lim_{x \rightarrow -3^{(-)}} \frac{2x^2+1}{x+3} = \underline{\underline{-\infty}}$$

c.) Definitionslücke:  $x = 1$

$$\lim_{x \rightarrow 1^{(+)}} \frac{x^2}{(x-1)^2} = \underline{\underline{+\infty}}$$

$$\lim_{x \rightarrow 1^{(-)}} \frac{x^2}{(x-1)^2} = \underline{\underline{+\infty}}$$

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

d.)  $\frac{x^2+10}{3x^2-x^3} = \frac{x^2+10}{x^2(3-x)}$

Definitionslücken:  $x = 0$  und  $x = 3$

$$\lim_{x \rightarrow 0^{(+)}} \frac{x^2+10}{x^2(3-x)} = \underline{\underline{+\infty}}$$

$$\lim_{x \rightarrow 0^{(-)}} \frac{x^2+10}{x^2(3-x)} = \underline{\underline{+\infty}}$$

$$\lim_{x \rightarrow 3^{(+)}} \frac{x^2+10}{x^2(3-x)} = \underline{\underline{-\infty}}$$

$$\lim_{x \rightarrow 3^{(-)}} \frac{x^2+10}{x^2(3-x)} = \underline{\underline{+\infty}}$$

e) Definitionslücke:  $x = -2$

$$\lim_{x \rightarrow -2} \frac{(x+2)(x-2)}{(x+2)} = \underline{\underline{-4}}$$

f) Definitionslücke:  $x = 1$

$$\frac{5x^2 - 5}{x - 1} = \frac{5(x^2 - 1)}{(x - 1)} = \frac{5(x+1)(x-1)}{(x-1)}$$

$$\lim_{x \rightarrow 1} 5(x+1) = \underline{\underline{10}}$$

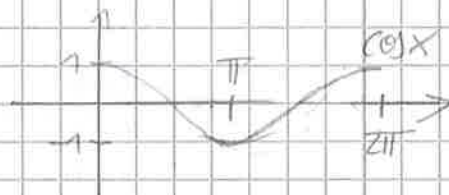
g) Definitionslücke:  $x = 5$

$$\frac{x^2 - 10x + 25}{x - 5} = \frac{(x-5)^2}{x-5}$$

$$\lim_{x \rightarrow 5} (x-5) = \underline{\underline{0}}$$

2) a)  $\lim_{x \rightarrow -1} (4x - 7) = \underline{\underline{-11}}$

b)  $\lim_{x \rightarrow \pi} \cos x = \underline{\underline{-1}}$



c)  $\lim_{x \rightarrow 4} (0,5x - 2,5) = -0,5$

d)  $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4} = \lim_{x \rightarrow 4} \frac{(x+4)(x-4)}{(x-4)} = \underline{\underline{8}}$

e)  $\lim_{x \rightarrow 0} \frac{2x^3 + 3x^2}{x^2} = \lim_{x \rightarrow 0} \frac{x^2(2x+3)}{x^2} = \underline{\underline{3}}$