

Aufgabe 5.1

$$f(x) = 2x^2 - 8x - 42 = 2(x+3)(x-7)$$

Aufgabe 5.2

$$f(x) = 6x^3 - 18x$$

$$= 6x(x^2 - 3)$$

$$= 6x(x - \sqrt{3})(x + \sqrt{3})$$

Aufgabe 5.3

$$a) \lim_{x \rightarrow 3} \frac{x-3}{2x^2+2x-24} = \lim_{x \rightarrow 3} \frac{\cancel{(x-3)}}{2\cancel{(x-3)}(x+4)} =$$

$$\lim_{x \rightarrow 3} \frac{1}{2(x+4)} = \frac{1}{14}$$

$$b) \lim_{x \rightarrow 5} \frac{x^2-10x+25}{3x^2-9x-30} = \lim_{x \rightarrow 5} \frac{\cancel{(x-5)}(x-5)}{3\cancel{(x-5)}(x+2)} =$$

$$\lim_{x \rightarrow 5} \frac{x-5}{3(x+2)} = \frac{0}{21} = 0$$

$$c) \lim_{x \rightarrow -2} \frac{4x+8}{7x^2-14x-56} = \lim_{x \rightarrow -2} \frac{4\cancel{(x+2)}}{7\cancel{(x+2)}(x-4)} =$$

$$\lim_{x \rightarrow -2} \frac{4}{7(x-4)} = \frac{4}{-42} = -\frac{2}{21}$$

$$d) \lim_{x \rightarrow 2} \frac{x-4}{x-2} \text{ existiert nicht!}$$

x	1.9	1.99	1.999		2.1	2.01	2.001
$\frac{x-4}{x-2}$	21	201	2001		-19	-199	-1999
			$\rightarrow +\infty$				$\rightarrow -\infty$