

Mathe Vorkurs Online - Übungen Blatt 6

Aufgabe 6.1.1: Bestimmen Sie den Grenzwert:

$$\lim_{x \rightarrow 0} 5 \cdot (10x)^{12x}$$

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|-----------------------------------------------|------------------------------------------------|-------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 $5e^{\frac{5}{6}}$ | <input type="checkbox"/> 2 1 | <input type="checkbox"/> 3 60 | <input type="checkbox"/> 4 $\frac{6}{5}$ |
| <input type="checkbox"/> 5 ∞ | <input type="checkbox"/> 6 $5e^{\frac{12}{5}}$ | <input type="checkbox"/> 7 0 | <input type="checkbox"/> 8 5 |
| <input type="checkbox"/> 9 $\frac{1}{5}$ | <input type="checkbox"/> 10 $\frac{6}{25}$ | <input type="checkbox"/> 11 6 | <input type="checkbox"/> 12 $-\infty$ |

Aufgabe 6.1.2:

Sei $f: \mathbb{R} \setminus \{5\} \rightarrow \mathbb{R}$: $f(x) = (6x - 30) \cdot \cos\left(\frac{7}{4x - 20}\right)$. Bestimmen Sie den Grenzwert: $\lim_{x \rightarrow 5} f(x)$

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|--------------------------------------|--------------------------------------------|-------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> 1 5 | <input type="checkbox"/> 2 $\frac{7}{4}$ | <input type="checkbox"/> 3 es gibt keinen | <input type="checkbox"/> 4 1 |
| <input type="checkbox"/> 5 $-\infty$ | <input type="checkbox"/> 6 0 | <input type="checkbox"/> 7 ∞ | <input type="checkbox"/> 8 ± 1 |
| <input type="checkbox"/> 9 4 | <input type="checkbox"/> 10 $\frac{21}{2}$ | <input type="checkbox"/> 11 $[-1, 1]$ | <input type="checkbox"/> 12 $\frac{37}{9}$ |

Aufgabe 6.1.3: Bestimmen Sie den Grenzwert:

$$\lim_{x \rightarrow \infty} \frac{2 \ln(x^6 + 11)}{\ln x^{13}}$$

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|------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|
| <input type="checkbox"/> 1 $\ln \frac{12}{13}$ | <input type="checkbox"/> 2 $\ln \frac{13}{12}$ | <input type="checkbox"/> 3 1 | <input type="checkbox"/> 4 $\frac{\ln 23}{\ln 13}$ |
| <input type="checkbox"/> 5 $\ln \frac{23}{13}$ | <input type="checkbox"/> 6 $\frac{\ln 13}{\ln 12}$ | <input type="checkbox"/> 7 $\frac{13}{23}$ | <input type="checkbox"/> 8 $\frac{13}{12}$ |
| <input type="checkbox"/> 9 $\frac{12}{13}$ | <input type="checkbox"/> 10 0 | <input type="checkbox"/> 11 $\frac{\ln 12}{\ln 13}$ | <input type="checkbox"/> 12 ∞ |

Aufgabe 6.1.4: Bestimmen Sie die waagrechten Asymptoten der folgenden Funktion:

$$f(x) = \frac{5x^2 - 40x + 60}{8 - 8x + 2x^2}$$

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|----------------------------------------------|---------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> 1 $y = 0$ | <input type="checkbox"/> 2 $x = -\infty$ | <input type="checkbox"/> 3 $y = \frac{5}{2}$ | <input type="checkbox"/> 4 $x = 2$ |
| <input type="checkbox"/> 5 $x = \frac{5}{2}$ | <input type="checkbox"/> 6 $y = -\frac{5}{2}$ | <input type="checkbox"/> 7 $x = -\frac{5}{2}$ | <input type="checkbox"/> 8 $x = -2$ |
| <input type="checkbox"/> 9 $y = -2$ | <input type="checkbox"/> 10 $y = \frac{\infty}{\infty}$ | <input type="checkbox"/> 11 $x = 0$ | <input type="checkbox"/> 12 $x = \frac{\infty}{\infty}$ |

Aufgabe 6.1.5: Bestimmen Sie den Grenzwert:

$$\lim_{x \rightarrow 3} \frac{2x^3 - 22x^2 + 78x - 90}{5x^3 - 65x^2 + 255x - 315}$$

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|------------------------------------------|--------------------------------------------|------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> 1 1 | <input type="checkbox"/> 2 $\frac{22}{65}$ | <input type="checkbox"/> 3 8 | <input type="checkbox"/> 4 $\frac{8}{125}$ |
| <input type="checkbox"/> 5 $-\infty$ | <input type="checkbox"/> 6 $\frac{31}{83}$ | <input type="checkbox"/> 7 $\frac{0}{0}$ | <input type="checkbox"/> 8 3 |
| <input type="checkbox"/> 9 $\frac{2}{7}$ | <input type="checkbox"/> 10 $\frac{1}{5}$ | <input type="checkbox"/> 11 ∞ | <input type="checkbox"/> 12 $\frac{2}{5}$ |

Aufgabe 6.1.6: Bestimmen Sie den Grenzwert:

$$\lim_{x \rightarrow 12} \frac{5x^2 - 40x + 80}{2x^3 - 16x^2 + 32x}$$

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|------------------------------------------|------------------------------------------|-------------------------------------------|---------------------------------------------|
| <input type="checkbox"/> 1 $\frac{5}{2}$ | <input type="checkbox"/> 2 5 | <input type="checkbox"/> 3 $-\infty$ | <input type="checkbox"/> 4 4 |
| <input type="checkbox"/> 5 ∞ | <input type="checkbox"/> 6 $\frac{0}{0}$ | <input type="checkbox"/> 7 $\frac{5}{24}$ | <input type="checkbox"/> 8 $\frac{-17}{24}$ |
| <input type="checkbox"/> 9 $\frac{1}{2}$ | <input type="checkbox"/> 10 0 | <input type="checkbox"/> 11 1 | <input type="checkbox"/> 12 162 |

Aufgabe 6.1.7: Bestimmen Sie alle waagrechten Asymptoten der folgenden Funktion:

$$f(x) = \frac{7 \cdot \arctan_{\pi}(5x + 8)}{2}$$

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|--------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> 1 $y = \pm \frac{\pi}{2}$ | <input type="checkbox"/> 2 $y = \frac{7}{2}$ oder $y = \frac{9}{2}$ | <input type="checkbox"/> 3 es gibt keine | <input type="checkbox"/> 4 $y = \frac{(2k+1)\pi}{2} \cdot \frac{7}{2}$ |
| <input type="checkbox"/> 5 $y = \pm \frac{7}{4}\pi$ | <input type="checkbox"/> 6 $y = \frac{(2k+1)\pi}{2}$ | <input type="checkbox"/> 7 $y = \frac{21}{4}\pi$ | <input type="checkbox"/> 8 $y = \frac{7}{4}\pi$ oder $y = \frac{21}{4}\pi$ |
| <input type="checkbox"/> 9 $y = \frac{\infty}{\infty}$ | <input type="checkbox"/> 10 $y = \frac{1}{2}\pi$ oder $y = \frac{3}{2}\pi$ | <input type="checkbox"/> 11 $y = k \cdot \pi$ | <input type="checkbox"/> 12 $y = \pm \frac{7}{2}$ |

Aufgabe 6.1.8: Bestimmen Sie den Grenzwert:

$$\lim_{x \rightarrow -2} \frac{5x + 10}{\sin(10x + 20)}$$

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|------------------------------------------------|------------------------------------------------|-------------------------------------------------|------------------------------------------------|
| <input type="checkbox"/> 1 ∞ | <input type="checkbox"/> 2 $\frac{5}{\sin 10}$ | <input type="checkbox"/> 3 $-\infty$ | <input type="checkbox"/> 4 $\frac{2}{\sin 10}$ |
| <input type="checkbox"/> 5 0 | <input type="checkbox"/> 6 1 | <input type="checkbox"/> 7 $\frac{10}{\sin 20}$ | <input type="checkbox"/> 8 $\frac{1}{2}$ |
| <input type="checkbox"/> 9 $\frac{2}{\cos 10}$ | <input type="checkbox"/> 10 $\frac{1}{10}$ | <input type="checkbox"/> 11 -2 | <input type="checkbox"/> 12 5 |

Allgemeine Hinweise:

Bei weiteren Fragen, wenden Sie sich bitte an W. Schmid (sltsoftware@yahoo.de).

Weitere Hinweise finden Sie auf unserer Veranstaltungswebseite unter: <http://www.vorkurs.de.vu>