

Aufgabensammlung zur Vorklausur (Stand: 17.11.2018)

Aufgabe 1: Vereinfachen Sie folgende Brüche auf einen ganzzahligen, teilerfremden Bruch oder eine endliche Dezimalzahl.

Probe1

$$\frac{0,69}{0,3} =$$

$$\frac{0,224}{0,14} =$$

$$\frac{3,333}{0,033} =$$

$$\frac{6}{2,5} \cdot \frac{1,5}{36} =$$

$$1 : \frac{0,7}{14} =$$

$$\frac{8}{0,3} : \frac{4}{0,15} =$$

$$\frac{7}{0,4} - \frac{5}{0,3} =$$

$$\frac{3}{0,4} - \frac{3}{2} =$$

$$\frac{0,7 \cdot 10^6}{2,8 \cdot 10^5} =$$

$$\frac{1,36 \cdot 10^{-3}}{0,34 \cdot 10^{-4}} =$$

Probe2

$$\frac{0,56}{0,7} =$$

$$\frac{0,272}{0,16} =$$

$$\frac{3,2032}{0,0016} =$$

$$\frac{5}{2,1} \cdot \frac{0,63}{0,15} =$$

$$1 : \frac{2,3}{46} =$$

$$\frac{7}{0,4} : \frac{2,1}{6} =$$

$$\frac{7,4}{0,7} - \frac{2,1}{0,2} =$$

$$\frac{6}{0,7} - \frac{4}{7} =$$

$$\frac{2,7 \cdot 10^8}{0,9 \cdot 10^5} =$$

$$\frac{3,9 \cdot 10^{-4}}{0,13 \cdot 10^{-5}} =$$

WS 07/08

$$\frac{0,42}{0,2} =$$

$$\frac{0,156}{0,12} =$$

$$\frac{2,525}{0,025} =$$

$$\frac{4}{1,8} \cdot \frac{2,7}{2} =$$

$$1 : \frac{0,4}{8} =$$

$$\frac{5}{0,4} : \frac{2}{0,16} =$$

$$\frac{4}{0,3} - \frac{5}{0,4} =$$

$$\frac{4}{0,3} - \frac{1}{3} =$$

$$\frac{2,5 \cdot 10^5}{5 \cdot 10^3} =$$

$$\frac{1,4 \cdot 10^{-2}}{5,6 \cdot 10^{-4}} =$$

SS 08

$$\frac{0,72}{0,3} =$$

$$\frac{0,304}{0,16} =$$

$$\frac{7,07}{0,035} =$$

$$\frac{4,5}{4} \cdot \frac{8}{1,5} =$$

$$1 : \frac{0,3}{12} =$$

$$\frac{7}{0,6} : \frac{2,8}{12} =$$

$$\frac{5}{0,6} - \frac{3}{0,4} =$$

$$\frac{8}{0,7} - \frac{17}{7} =$$

$$\frac{1,2 \cdot 10^7}{4,8 \cdot 10^4} =$$

$$\frac{2,8 \cdot 10^{-3}}{5,6 \cdot 10^{-4}} =$$

WS 08/09

$$\frac{0,48}{0,6} =$$

$$\frac{0,234}{0,18} =$$

$$\frac{10,89}{0,033} =$$

$$\frac{8,5}{4} \cdot \frac{12}{1,7} =$$

$$1 : \frac{0,5}{7,5} =$$

$$\frac{15}{0,7} : \frac{3}{0,14} =$$

$$\frac{5}{0,4} - \frac{7}{0,6} =$$

$$\frac{7}{0,8} - \frac{3}{4} =$$

$$\frac{2,1 \cdot 10^8}{8,4 \cdot 10^6} =$$

$$\frac{6,9 \cdot 10^{-5}}{2,3 \cdot 10^{-6}} =$$

SS 09

$$\frac{0,64}{0,4} =$$

$$\frac{0,306}{0,18} =$$

$$\frac{9,999}{0,0099} =$$

$$\frac{3,5}{0,3} \cdot \frac{3,6}{14} =$$

$$1 : \frac{2,4}{72} =$$

$$\frac{6}{0,7} : \frac{1,2}{0,42} =$$

$$\frac{10}{0,8} - \frac{1,75}{0,7} =$$

$$\frac{5}{0,6} - \frac{1}{3} =$$

$$\frac{3,6 \cdot 10^6}{0,9 \cdot 10^4} =$$

$$\frac{1,3 \cdot 10^{-8}}{6,5 \cdot 10^{-10}} =$$

WS 09/10

$$\frac{0,85}{0,5} =$$

$$\frac{0,288}{0,16} =$$

$$\frac{4,221}{0,021} =$$

$$\frac{0,84}{2,6} \cdot \frac{13}{2,1} =$$

$$1 : \frac{1,4}{42} =$$

$$\frac{9}{0,4} : \frac{2,7}{0,24} =$$

$$\frac{10}{0,7} - \frac{7}{0,5} =$$

$$\frac{7}{0,4} - \frac{5}{2} =$$

$$\frac{0,6 \cdot 10^7}{2,4 \cdot 10^5} =$$

$$\frac{8,1 \cdot 10^{-6}}{2,7 \cdot 10^{-7}} =$$

SS 10

$$\frac{0,63}{0,7} =$$

$$\frac{0,182}{0,14} =$$

$$\frac{4,444}{0,044} =$$

$$\frac{6,5}{1,2} \cdot \frac{0,24}{1,3} =$$

$$1 : \frac{0,7}{28} =$$

$$\frac{16}{0,3} : \frac{6,4}{0,36} =$$

$$\frac{7,3}{0,6} - \frac{0,5}{0,12} =$$

$$\frac{9}{0,8} - \frac{5}{4} =$$

$$\frac{6,3 \cdot 10^5}{1,8 \cdot 10^4} =$$

$$\frac{2,1 \cdot 10^{-5}}{8,4 \cdot 10^{-7}} =$$

WS 10/11

$$\begin{array}{ccccc} \frac{0,54}{0,6} = & \frac{0,192}{0,12} = & \frac{6,66666}{0,00222} = & \frac{2,4 \cdot 39}{1,3 \cdot 8} = & 1 : \frac{0,7}{21} = \\ \frac{24}{0,7} : \frac{1,2}{0,49} = & \frac{2,3}{0,3} - \frac{7,7}{2,1} = & \frac{6}{0,7} - \frac{25}{7} = & \frac{4,8 \cdot 10^8}{6,4 \cdot 10^6} = & \frac{7,2 \cdot 10^{-5}}{2,4 \cdot 10^{-6}} = \end{array}$$

SS 11

$$\begin{array}{ccccc} \frac{0,72}{0,8} = & \frac{0,285}{0,15} = & \frac{8,888}{0,0044} = & \frac{14}{0,9} \cdot \frac{1,35}{2,1} = & 1 : \frac{0,6}{24} = \\ \frac{7}{0,3} : \frac{3,5}{0,15} = & \frac{2,3}{0,3} - \frac{4}{1,5} = & \frac{7,1}{0,6} - \frac{11}{6} = & \frac{81 \cdot 10^5}{2,7 \cdot 10^4} = & \frac{8,1 \cdot 10^{-3}}{27 \cdot 10^{-4}} = \end{array}$$

WS 11/12

$$\begin{array}{ccccc} \frac{0,56}{0,8} = & \frac{0,255}{0,15} = & \frac{77,077}{0,011} = & \frac{0,51}{0,9} \cdot \frac{21}{1,7} = & 1 : \frac{0,9}{63} = \\ \frac{28}{1,3} : \frac{1,2}{0,39} = & \frac{3,7}{0,4} - \frac{2,7}{1,2} = & \frac{8}{0,3} + \frac{65}{1,5} = & \frac{8,4 \cdot 10^7}{1,2 \cdot 10^3} = & \frac{2,1 \cdot 10^{-2}}{0,3 \cdot 10^{-5}} = \end{array}$$

SS 12

$$\begin{array}{ccccc} \frac{0,91}{0,7} = & \frac{0,391}{0,23} = & \frac{3,8038}{0,0019} = & \frac{3,3}{0,8} \cdot \frac{5,6}{1,1} = & 1 : \frac{0,7}{28} = \\ \frac{0,28}{1,3} : \frac{0,7}{65} = & \frac{13}{0,4} - \frac{61}{2} = & \frac{19}{0,6} - \frac{46}{1,5} = & \frac{7 \cdot 10^9}{2,8 \cdot 10^8} = & \frac{6,5 \cdot 10^{-4}}{26 \cdot 10^{-6}} = \end{array}$$

WS 12/13

$$\begin{array}{ccccc} \frac{0,56}{0,8} = & \frac{0,221}{0,13} = & \frac{1,5554}{0,0022} = & \frac{0,84}{0,9} \cdot \frac{18}{2,4} = & 1 : \frac{0,03}{21} = \\ \frac{0,28}{0,3} : \frac{1,2}{9} = & \frac{3,1}{2,1} - \frac{4}{3} = & \frac{82}{0,7} - \frac{9,9}{0,21} = & \frac{0,9 \cdot 10^6}{0,63 \cdot 10^7} = & \frac{0,42 \cdot 10^{-3}}{0,6 \cdot 10^{-5}} = \end{array}$$

SS 13

$$\begin{array}{ccccc} \frac{0,92}{0,4} = & \frac{0,272}{0,17} = & \frac{70,7}{0,035} = & \frac{0,69}{0,7} \cdot \frac{21}{2,3} = & 1 : \frac{0,35}{7} = \\ \frac{0,63}{0,8} : \frac{0,9}{56} = & \frac{4,5}{2,8} - \frac{8,5}{14} = & \frac{62}{0,9} - \frac{7}{0,18} = & \frac{0,6 \cdot 10^6}{0,24 \cdot 10^5} = & \frac{0,48 \cdot 10^{-5}}{1,2 \cdot 10^{-7}} = \end{array}$$

WS 13/14

$$\begin{array}{ccccc} \frac{0,42}{0,7} = & \frac{0,24}{0,15} = & \frac{6,666}{0,011} = & \frac{0,52}{0,2} \cdot \frac{3}{0,13} = & 1 : \frac{0,08}{48} = \\ \frac{0,84}{1,8} : \frac{0,7}{9} = & \frac{3,8}{0,4} - 8,9 = & \frac{7}{0,8} - \frac{11}{4} = & \frac{2,5 \cdot 10^3}{1,5 \cdot 10^4} = & \frac{0,54 \cdot 10^{-5}}{0,9 \cdot 10^{-7}} = \end{array}$$

SS 14

$$\begin{array}{ccccc} \frac{0,54}{0,6} = & \frac{0,234}{0,18} = & \frac{7,07}{0,035} = & \frac{0,84}{2,6} \cdot \frac{13}{2,1} = & 1 : \frac{1,3}{26} = \\ \frac{6}{0,7} : \frac{1,2}{0,42} = & \frac{7,3}{0,6} - \frac{0,5}{0,12} = & \frac{8}{0,3} + \frac{65}{1,5} = & \frac{6,3 \cdot 10^5}{1,8 \cdot 10^4} = & \frac{2,8 \cdot 10^{-3}}{5,6 \cdot 10^{-4}} = \end{array}$$

WS 14/15

$$\begin{array}{ccccc} \frac{0,63}{0,7} = & \frac{0,288}{0,18} = & \frac{0,3434}{0,0017} = & \frac{0,68}{1,2} \cdot \frac{30}{1,7} = & 1 : \frac{0,13}{39} = \\ \frac{0,57}{0,4} : \frac{1,9}{12} = & \frac{1,05}{0,18} - \frac{5}{6} = & \frac{3}{0,7} + \frac{12}{7} = & \frac{5,6 \cdot 10^7}{8 \cdot 10^6} = & \frac{0,72 \cdot 10^{-3}}{18 \cdot 10^{-5}} = \end{array}$$

SS 15

$$\begin{array}{ccccc} \frac{0,64}{0,4} = & \frac{0,192}{0,12} = & \frac{66,66}{0,011} = & \frac{4,5}{0,4} \cdot \frac{8}{15} = & 1 : \frac{0,7}{420} = \\ \frac{1,68}{0,36} : \frac{2,1}{27} = & \frac{31}{0,4} - \frac{21}{1,2} = & \frac{0,23}{0,03} - \frac{5}{3} = & \frac{78 \cdot 10^5}{1,3 \cdot 10^6} = & \frac{5,4 \cdot 10^{-5}}{9 \cdot 10^{-8}} = \end{array}$$

WS 15/16

$$\begin{array}{ccccc} \frac{0,98}{0,7} = & \frac{0,272}{0,16} = & \frac{550,55}{0,55} = & \frac{0,72}{0,15} \cdot \frac{2,5}{2,4} = & 1 : \frac{0,8}{56} = \\ \frac{0,68}{0,8} : \frac{1,7}{2} = & \frac{7}{3,2} - \frac{3}{16} = & \frac{7,5}{0,6} - \frac{5,25}{0,7} = & \frac{0,63 \cdot 10^7}{9 \cdot 10^4} = & \frac{1,1 \cdot 10^{-3}}{55 \cdot 10^{-5}} = \end{array}$$

SS 16

$$\begin{array}{ccccc} \frac{0,78}{0,6} = & \frac{0,182}{0,14} = & \frac{1231,23}{1,23} = & \frac{0,56}{0,6} \cdot \frac{1,5}{1,4} = & 1 : \frac{1,3}{52} = \\ \frac{0,76}{0,6} : \frac{1,9}{3} = & \frac{7}{4,8} - \frac{5,5}{12} = & \frac{5,4}{0,5} - \frac{3,14}{0,3} = & \frac{0,48 \cdot 10^5}{0,8 \cdot 10^3} = & \frac{2,3 \cdot 10^{-2}}{46 \cdot 10^{-4}} = \end{array}$$

WS 16/17

$$\begin{array}{ccccc} \frac{0,54}{0,9} = & \frac{0,221}{0,17} = & \frac{707,07}{0,7} = & \frac{0,42}{0,9} \cdot \frac{3}{0,7} = & 1 : \frac{0,8}{24} = \\ \frac{1,2}{1,7} \cdot \frac{0,72}{5,1} = & \frac{9}{5,5} - \frac{3}{22} = & \frac{7}{3} + \frac{2}{7} - \frac{13}{21} = & \frac{0,26 \cdot 10^7}{1,3 \cdot 10^5} = & \frac{5,6 \cdot 10^{-2}}{80 \cdot 10^{-5}} = \end{array}$$

SS 17

$$\begin{array}{ccccc} \frac{0,36}{0,48} = & \frac{0,432}{0,72} = & \frac{40,404}{0,4} = & \frac{0,68}{1,2} \cdot \frac{3}{1,7} = & 1 : \frac{0,04}{1,6} = \\ \frac{1,3}{20} : \frac{0,52}{16} = & \frac{5}{3,6} - \frac{3,5}{9} = & \frac{16,8}{1,5} - \frac{2,04}{0,2} = & \frac{0,76 \cdot 10^9}{1,9 \cdot 10^7} = & \frac{0,12 \cdot 10^{-4}}{60 \cdot 10^{-7}} = \end{array}$$

WS 17/18

$$\begin{array}{ccccc} \frac{0,48}{0,64} = & \frac{0,255}{0,15} = & \frac{1,5554}{0,022} = & \frac{0,84}{2,6} \cdot \frac{13}{2,1} = & 1 : \frac{0,07}{28} = \\ \frac{28}{1,3} \cdot \frac{1,2}{0,39} = & \frac{4,5}{2,8} - \frac{8,5}{14} = & \frac{8}{0,3} + \frac{65}{1,5} = & \frac{91 \cdot 10^5}{1,3 \cdot 10^6} = & \frac{0,42 \cdot 10^{-3}}{0,6 \cdot 10^{-5}} = \end{array}$$

SS 18

$$\begin{array}{ccccc} \frac{1,04}{0,8} = & \frac{0,221}{0,17} = & \frac{3,0303}{0,03} = & \frac{0,56}{1,6} \cdot \frac{8}{0,7} = & 1 : \frac{0,3}{0,39} = \\ \frac{0,63}{2,7} : \frac{0,14}{1,2} = & \frac{7}{3,2} - \frac{9,5}{8} = & \frac{3,4}{0,7} - \frac{6,5}{3,5} = & \frac{7,8 \cdot 10^5}{600 \cdot 10^3} = & \frac{1,69 \cdot 10^{-4}}{13 \cdot 10^{-6}} = \end{array}$$

WS 18/19

$$\begin{array}{ccccc} \frac{0,96}{0,72} = & \frac{0,234}{0,18} = & \frac{33,033}{0,11} = & \frac{3,3}{0,8} \cdot \frac{5,6}{1,1} = & 1 : \frac{0,08}{48} = \\ \frac{0,65}{0,7} : \frac{1,3}{28} = & \frac{0,31}{0,21} - \frac{0,4}{0,3} = & \frac{0,8}{0,03} + \frac{6,5}{0,15} = & \frac{0,25 \cdot 10^4}{0,15 \cdot 10^5} = & \frac{5,4 \cdot 10^{-6}}{9 \cdot 10^{-8}} = \end{array}$$

Aufgabe 2: Bestimmen Sie – sofern existent – die Nullstellen folgender Funktionen.

Probe1

$$\begin{array}{ccc} f(x) = -3x^2 + 6x + 9 & f(x) = -\frac{2}{3}x^4 + \frac{8}{3}x^2 & f(x) = 2^x \cdot (x^3 - 27) \\ f(x) = \frac{(2x-3)^2 - (x-1) \cdot (2x-3)}{(2x-3)^2} & & f(x) = \frac{x^2-7}{(x+2)^2} + \frac{2}{x+2} \end{array}$$

Probe2	$f(x) = -2x^2 + 10x - 12$ $f(x) = \frac{(2x-5)^2 - (x-3) \cdot (2x-5)}{(2x-5)^2}$	$f(x) = -x^4 + 4x^3 - 3x^2$	$f(x) = 3^x \cdot (x^4 - 16)$ $f(x) = \frac{x^2+1}{(x+2)^2} - \frac{2}{x+2}$
WS 07/08	$f(x) = 4x^2 - 28x + 40$ $f(x) = \frac{(x-1)^2 - (x-3) \cdot (x-1)}{(x-1)^2}$	$f(x) = -\frac{4}{28}x^3 + \frac{18}{14}x$	$f(x) = e^x \cdot (x^2 - 4)$ $f(x) = \frac{x^2-7}{(x+1)^2} + \frac{3}{x+1}$
SS 08	$f(x) = -2x^2 - 2x + 12$ $f(x) = \frac{(2x-3)^3 - (2x-3)^2 \cdot (x+1)}{(2x-3)^3}$	$f(x) = \frac{3}{4}x^5 - 3x^3$	$f(x) = 4^x \cdot (x^4 - 16)$ $f(x) = \frac{2x^2+1}{(x+2)^2} - \frac{2x+5}{x+2}$
WS 08/09	$f(x) = -5x^2 + 25x - 30$ $f(x) = \frac{(3x-4)^4 - (x-2) \cdot (3x-4)^3}{(3x-4)^4}$	$f(x) = -\frac{3}{4}x^4 + 3x^2$	$f(x) = 3^{x-2} \cdot (x^2 - \frac{1}{4})$ $f(x) = \frac{2x^2+5}{(2x+3)^2} - \frac{x-1}{2x+3}$
SS 09	$f(x) = -7x^2 + 35x - 42$ $f(x) = \frac{(5x-8) \cdot (3x-4)^4 - (3x-4)^5}{(3x-4)^5}$	$f(x) = -\frac{3}{4}x^7 + 12x^5$	$f(x) = e^{x+1} \cdot (x^4 - 2x^2 + 1)$ $f(x) = \frac{3x^2+1}{(2x+1)^2} - \frac{x+1}{2x+1}$
WS 09/10	$f(x) = -6x^2 + 12x + 18$ $f(x) = \frac{(2x+1)^3 - (x+3) \cdot (2x+1)^2}{(2x+1)^3}$	$f(x) = -\frac{2}{3}x^6 + 6x^4$	$f(x) = 5^{x-1} \cdot (x^3 + 8)$ $f(x) = \frac{5x^2-x+2}{(3x-2)^2} - \frac{2x+1}{3x-2}$
SS 10	$f(x) = -9x^2 + 45x - 54$ $f(x) = \frac{(2x-5)^3 \cdot (x-4) + (2x-5)^4}{(2x-5)^4}$	$f(x) = \frac{4}{5}x^5 - 20x^3$	$f(x) = 2^{x-2} \cdot (x^4 - x)$ $f(x) = \frac{4x^2+x-1}{(4x-3)^2} - \frac{x+3}{4x-3}$
WS 10/11	$f(x) = -4x^2 + 4x + 24$ $f(x) = \frac{(3x-1)^3 + (x+9) \cdot (3x-1)^2}{(3x-1)^3}$	$f(x) = -\frac{2}{7}x^3 + \frac{8}{7}x$	$f(x) = e^{2x+1} \cdot (x^4 - x^2)$ $f(x) = \frac{x+2}{2x-1} - \frac{2x^2-3x+4}{(2x-1)^2}$
SS 11	$f(x) = -6x^2 + 30x - 36$ $f(x) = \frac{(2x+1)^3 - (3x-2) \cdot (2x+1)^2}{(2x+1)^4}$	$f(x) = -\frac{3}{4}x^5 + 3x^3$	$f(x) = 5^{2x+3} \cdot (x^3 - x)$ $f(x) = \frac{x-4}{x-1} - \frac{3x^2-13x+10}{(x-1)^2}$
WS 11/12	$f(x) = -x^2 - x + 12$ $f(x) = \frac{(x+1)^3 - 4(x+1)^2}{x^2+1}$	$f(x) = x^4 - x^3 - 6x^2$	$f(x) = 2^{\sin(x)} \cdot (x^3 + 1)$ $f(x) = \frac{x^2-1}{(x-1)^3} - \frac{2}{x-1}$
SS 12	$f(x) = -2x^2 + 6x + 8$ $f(x) = \frac{(x+1) \cdot (x-1)^2 - (x+1)^2 \cdot (x-1)}{x^3+1}$	$f(x) = -x^3 + 2x^2 + 3x$	$f(x) = 3^{x-2} \cdot (x^5 - x^2)$ $f(x) = \frac{x^2-4}{(x-2)^2} - \frac{x+1}{x-2}$
WS 12/13	$f(x) = -3x^2 + 6x + 24$ $f(x) = \frac{(x+1)^4 - (x^2-1) \cdot (x+1)^2}{(x+1)^4}$	$f(x) = -x^3 + x^2 + 2x$	$f(x) = e^{x-1} \cdot (x^4 + x)$ $f(x) = \frac{2x-1}{x-1} - \frac{2x+1}{x+1}$
SS 13	$f(x) = -2x^2 + 12x - 16$ $f(x) = \frac{(4x-1)^4 - (2x+1) \cdot (4x-1)^3}{(4x-1)^4}$	$f(x) = -x^4 + 6x^3 - 5x^2$	$f(x) = 4^{3x-6} \cdot (x^4 - 2x^2 + 1)$ $f(x) = \frac{x+1}{2x+1} - \frac{x-1}{2x-1}$
WS 13/14	$f(x) = -5x^2 + 30x - 40$ $f(x) = \frac{(x-2)^2 \cdot (3x-2) + (x^2-4) \cdot (x-2)}{(x-2)^3}$	$f(x) = -x^4 + 5x^3 - 6x^2$	$f(x) = 2^{1-x} \cdot (x^6 + x^3)$ $f(x) = \frac{x^2+9}{(x+3)^2} - \frac{x-3}{x+3}$
SS 14	$f(x) = -4x^2 + 24x - 32$ $f(x) = \frac{(x-3)^2 \cdot (2x+1) + (x^2-x-6) \cdot (x-3)}{(x-3)^3}$	$f(x) = \frac{1}{2}x^5 + 4x^2$	$f(x) = e^{\sin(x)} \cdot (x^4 - 1)$ $f(x) = \frac{3x-1}{3x+1} - \frac{3x+1}{3x-1}$

WS 14/15	$f(x) = -5x^2 + 5x + 30$	$f(x) = \frac{1}{2}x^4 - 4x^2 + 8$	$f(x) = 3^{\cos(x)} \cdot (x^5 + 1)$
	$f(x) = \frac{(x+2)^2 \cdot (3x+1) - (2x^2+5x+2) \cdot (x+2)}{(x+2)^4}$		$f(x) = \frac{2x-1}{2x+1} + \frac{2x+1}{2x-1}$
SS 15	$f(x) = -2x^2 - 2x + 12$	$f(x) = x^4 - x^3 - 6x^2$	$f(x) = 4^{x-4} \cdot (x^4 + x^2)$
	$f(x) = \frac{(x-4) \cdot (2x-1)^3 + 2(2x^2-3x+1) \cdot (2x-1)^2}{(2x-1)^4}$		$f(x) = \frac{x^3-1}{(x-1)^3} - \frac{x^2-1}{(x-1)^2}$
WS 15/16	$f(x) = -6x^2 + 6x + 12$	$f(x) = x^5 + 2x^3 + x$	$f(x) = e^{x-1} \cdot (x^4 + x)$
	$f(x) = \frac{(3x+1)^3 \cdot (2x-1) + (x+2) \cdot (3x+1)^3}{(3x+1)^4}$		$f(x) = \frac{x^3}{(x-2)^2} + \frac{x^2}{x-2}$
SS 16	$f(x) = -2x^2 + 4x + 6$	$f(x) = x^4 + 2x^3 - 3x^2$	$f(x) = 2^{x^2-4} \cdot (x - \frac{1}{x})$
	$f(x) = \frac{4x^2 - 9 - (3x+1) \cdot (2x-3)}{(2x-3)^2}$		$f(x) = \frac{(x-1)^2}{(x+1)^2} - \frac{(x+1)^2}{(x-1)^2}$
WS 16/17	$f(x) = -3x^2 - 6x + 24$	$f(x) = x^3 - 2x^2 - 8x$	$f(x) = 5^{\frac{1}{x}} \cdot (x^2 - x)$
	$f(x) = \frac{9x^2 - 4 - (3x-2) \cdot (2x+3)}{(3x-2)^3}$		$f(x) = \frac{x-1}{x^2+1} - \frac{x+1}{x^2-1}$
SS 17	$f(x) = -7x^2 - 14x + 21$	$f(x) = -x^4 + 8x^2 - 16$	$f(x) = \ln(x) \cdot (x^3 - 8)$
	$f(x) = \frac{(3x+2) \cdot (x-3)^3 - (x^2+3x-18) \cdot (x-3)^2}{(x-3)^4}$		$f(x) = \frac{x^3+1}{x^2+1} - \frac{x^2+1}{x+1}$
WS 17/18	$f(x) = -6x^2 + 12x + 18$	$f(x) = -2x^3 + 4x^2 + 6x$	$f(x) = 3^{x^2-4} \cdot (x^2 - \frac{1}{x^2})$
	$f(x) = \frac{(x-3)^2 \cdot (2x+1) - (x^2-2x-3) \cdot (x-3)}{(x-3)^3}$		$f(x) = \frac{x^4-1}{x^2-1} - \frac{x^2-1}{x-1}$
SS 18	$f(x) = -5x^2 - 5x + 30$	$f(x) = -x^4 + x^3 + 6x^2$	$f(x) = \ln(2-x^2) \cdot (x^2 + 1)$
	$f(x) = \frac{(2x-3) \cdot (x-4)^2 - (x^2-5x+4) \cdot (x-4)}{(x-4)^3}$		$f(x) = \frac{4x^2+1}{4x^2-1} - \frac{2x-1}{2x+1}$
WS 18/19	$f(x) = -4x^2 + 4x + 24$	$f(x) = -\frac{3}{4}x^5 + 3x^3$	$f(x) = 4^{3x-6} \cdot (x^4 - 2x^2 + 1)$
	$f(x) = \frac{(x-3)^3 \cdot (2x+1) - (x^2-x-6) \cdot (x-3)^2}{(x-3)^4}$		$f(x) = \frac{x^2-1}{(x-1)^3} - \frac{2}{x-1}$

Aufgabe 3: Lösen Sie die folgenden Gleichungen nach x auf (alle in den Rechnungen auftauchenden Ausdrücke seien definiert). Vereinfachen Sie die Lösung soweit wie möglich.

Prob1	$e^{3x-1} = a$	$3^{x+1} = a$	$a \cdot (x^7 + 1) + b \cdot x^7 = c$
	$a \cdot (2^x + 1) + b \cdot 2^x = c$	$a \cdot 3^{x-1} + b \cdot 3^x = c$	
Probe2	$e^{x^2-4} = a$	$2^{x-1} = a$	$a \cdot x^3 + b \cdot (x^3 - 2) = c$
	$a \cdot (4^x + 1) + b \cdot (4^x - 2) = c$	$a \cdot 4^{x+1} + b \cdot 4^{x-1} = c$	
WS 07/08	$e^{2x-4} = a$	$4^x = a$	$a \cdot x^5 + b \cdot (x^5 - 1) = c$
	$a \cdot 3^x + b \cdot (3^x - 1) = c$	$a \cdot 2^x + b \cdot 2^{x+1} = c$	
SS 08	$e^{3x-3} = a$	$5^x = a$	$a \cdot (x^3 - 1) + b \cdot (x^3 + 1) = c$
	$a \cdot (2^x + 1) + b \cdot (2^x - 1) = c$	$a \cdot 3^{x+2} + b \cdot 3^x = c$	
WS 08/09	$e^{x^2} = a$	$2^{3x-1} = a$	$a \cdot (2x^3 - 1) + b \cdot (4x^3 - 1) = c$
	$a \cdot (4^x - 1) + b \cdot (2 \cdot 4^x - 1) = c$	$5^x + 5^{x+a} = b$	
SS 09	$\ln(x) - 1 = a$	$10^{3x-2} = a$	$a \cdot (3x^5 - 2) + b \cdot (2x^5 - 1) = c$
	$a \cdot (3 \cdot 5^x - 2) + b \cdot (2 \cdot 5^x - 1) = c$	$e^{x-a} + e^{x+a} = e^b$	

WS 09/10	$e^{x^3-1} = a$ $a \cdot (2^x - 2) + b \cdot (2^{x+1} - 3) = c$	$3^{2x-1} = a$ $2^{x+2} - 2^{x-2} = a$	$a \cdot (x^4 - 2) + b \cdot (2x^4 - 3) = c$
SS 10	$e^{x^2-1} - 1 = a$ $a \cdot 3^{x+1} - b \cdot 3^{x-1} = c$	$4^{4x-4} = a$ $4^{x+a} + 4^{x+b} = 4^c$	$a \cdot (2x^8 - 1) - b \cdot (3x^8 - 1) = c$
WS 10/11	$e^{ax+b} = c$ $a \cdot 2^x + b \cdot 2^{x+3} = 2a + 16b$	$2^{x^2} = a$ $2^{x+a} \cdot 2^{x+b} = 2^c$	$a \cdot (x^3 - a) + b \cdot (x^3 - b) = 2ab$
SS 11	$e^{x^4-1} - 1 = a$ $3^{x+1} - 3^x = 3^a$	$3^{ax-b} = c$ $e^{ax} = e^{x+1}$	$a \cdot (7x^4 + b) + a \cdot (9x^4 - b) = a^5$
WS 11/12	$e^{4-x} + 4 = a$ $6 \cdot 2^x + 2^{x+1} = 2^{2x}$	$3^{x^2-1} = a$ $4^x = 2^{x+3}$	$a \cdot (x^3 + b) - b \cdot (x^3 + a) = a^2 - b^2$
SS 12	$e^{-x+1} = \frac{1}{a}$ $3^{x+1} - 3^x = x \cdot 3^{x-1}$	$a^x - 1 = b$ $8^x = 2^{2x+a}$	$a \cdot (2x^5 + b) - b \cdot (x^5 + a) = 4a^2 - b^2$
WS 12/13	$e^{ax^2} - 1 = b$ $6 \cdot 3^x + 3^{x+1} = 3^{3x}$	$2^{x^2} = 16$ $2^{-2x-6} = 16^x$	$a \cdot (2x^3 - 3b) + b \cdot (x^3 - a) = 4a^2 + b^2$
SS 13	$e^{x^3-1} - a = 1$ $20 \cdot 4^x - 4^{x+2} = 4^{2x}$	$3^{3x-2} = 81$ $8^{-x} = 2^{-x+2}$	$a \cdot (x^2 - b) + b \cdot (x^2 - a) = a^2 + b^2$
WS 13/14	$2 \cdot e^{-x^2} = 1$ $2^x + 2^{x+1} = x \cdot 2^{x-1}$	$3^{x^2+1} = 9$ $9^{x-1} = 3^{x+1}$	$a \cdot (2x^4 + b) - b \cdot (x^4 + a) = 4a^2 - b^2$
SS 14	$a \cdot e^{-x} - b = 1$ $2^x + 2^{x+1} = 2^a$	$2^{x^2} = a^2$ $27^{x-1} = 3^{2x+1}$	$a \cdot (2x^2 - b) + b \cdot (x^2 - 2a) = 4a^2 + ab + b^2$
WS 14/15	$\frac{1}{a} \cdot e^{-x+1} - 1 = b$ $4^{x+1} - 15 \cdot 4^{x-1} = 16$	$a^{\frac{1}{x}} = e^b$ $8^{4-x} = 2^{4x-2}$	$a \cdot (3x^5 + 2b) - b \cdot (2x^5 + 3a) = 9a^2 - 13ab + 4b^2$
SS 15	$a - e^{bx} = 1$ $3^{2x+1} + 9^x = 36$	$(\frac{1}{x})^a = b$ $4^{x+1} = 8^{x+1}$	$a \cdot (2x^3 - b) + b \cdot (x^3 + 3a) = 4a^2 + 2ab - b^2$
WS 15/16	$e^{x-a} - 1 = b$ $2^{2x+1} - 2^{2x-1} = 6$	$2^{-\frac{4}{x}} = \frac{1}{4}$ $(2x+1)^{(x+1)} = (2x+1)^{(3x-1)}$	$a \cdot (3x^4 - b^2) - b \cdot (x^4 - ab) = 9a^2 - b^2$
SS 16	$a - e^{b-x^2} = 1$ $5^{x+1} - 4 \cdot 5^x - 4 \cdot 5^{x-1} = 5$	$8^{-\frac{1}{x^2}} = 2^{-\frac{3}{4}}$ $16^x + 4^{2x+1} = x \cdot 16^x$	$a \cdot (2x^3 + 3b) - b \cdot (x^3 - a) = 4a^2 + b^2$
WS 16/17	$e^{x^2-a^2} - b = 1$ $2^{3x+1} + 3 \cdot 8^x = 40$	$\frac{2}{3^x} = 27^{\frac{1}{x+1}}$ $e^{x^2+1} - e^{x^2-1} = e^2 - 1$	$a \cdot (4x^2 - b) + b \cdot (2x^2 + 3a) = 8a^2 + 10ab + 2b^2$
SS 17	$\frac{a+1}{e^{x-1}} - 1 = b$ $4^{x+1} - 8^x = 2^{2x+1}$	$5^{\frac{6x+2}{x-1}} = \frac{1}{25^x}$ $x^3 \cdot 3^{2x-1} = 9^{x+1}$	$a \cdot (5x^3 - 2b) - b \cdot (2x^3 - 3a) = 25a^2 + ab - 4b^2$
WS 17/18	$\frac{e^{-x+1}}{a+1} - b = 2$ $x^2 \cdot 2^{4x} + 16^x = 2x \cdot 4^{2x}$	$2^{3x+1} = \frac{16}{4^{x-1}}$ $e^x - 3e^{-x} = -2$	$a \cdot (2x^2 - b) + b \cdot (x^2 - 2a) = 4a^2 + ab + b^2$
SS 18	$\frac{2}{e^{-x+b}} + a = 1$ $5^{-2x+1} - (\frac{1}{25})^x = x^2 \cdot 25^{-x}$	$\frac{3^{x^2+1}}{27} = (\frac{1}{9})^{(x+1)}$ $2^x - 2^{-x+3} = 2$, Tipp: $y = 2^x$	$a \cdot (3x^2 + 2b) - b \cdot (x^2 - 2a) = 9a^2 - 2ab + b^2$
WS 18/19	$e^{1-x^3} - 1 = a$ $2^{4x+5} - 16^{x+1} = 2 \cdot 8^{x+2}$	$e^{x^2} = 16e^4$ $x^2 \cdot 3^{3x+1} = 27^{x+1}$	$a \cdot (2x^3 - b) + b \cdot (x^3 - 2a) = 4a^2 + ab + b^2$

Aufgabe 4: Bestimmen Sie die Lösungsmengen folgender Gleichungen.

Probe1	$(2x + 1)^2 = (x + 5)^2$ $\frac{\sqrt[5]{x^2 - 9}}{\sqrt[5]{x + 3}} = 1$	$(3x + 1)^{3/4} = 8$ $\frac{\sqrt[6]{x^5}}{\sqrt[3]{x^2}} = 2$	$16 \cdot x^{-4/3} = 1$
Probe2	$(2x + 1)^4 = (-x + 4)^4$ $\frac{\sqrt{4x^2 - 36}}{\sqrt{9x + 27}} = 2$	$(2x - 1)^{2/3} = 9$ $\frac{\sqrt{x^3}}{\sqrt[3]{x^4}} = 2$	$8 \cdot x^{-3/5} = 1$
WS 07/08	$(2x - 3)^2 = (3x - 2)^2$ $\frac{\sqrt[3]{x^2 - 4}}{\sqrt[3]{x + 2}} = 2$	$(x - 1)^{3/2} = 8$ $\frac{\sqrt{x^3}}{\sqrt[4]{x^5}} = 2$	$x^{-2/3} = 4$
SS 08	$(3x - 4)^4 = (4x - 3)^4$ $\frac{\sqrt[7]{9x^2 - 4}}{\sqrt[7]{3x + 2}} = 1$	$(5x + 1)^{5/4} = 32$ $\frac{\sqrt[3]{x^4}}{\sqrt[6]{x^7}} = 2$	$4x^{-2/5} = 1$
WS 08/09	$(5x - 3)^6 = (3x - 5)^6$ $\frac{\sqrt[5]{x^2 - 4x + 4}}{\sqrt[5]{x^2 - 4}} = -1$	$(6x + 2)^{3/5} = 8$ $\sqrt{x^3 \cdot \sqrt[3]{x}} = 32$	$48x^{-4/5} = 3$
SS 09	$(3x + 5)^{10} = (x + 7)^{10}$ $\frac{\sqrt{9x^2 - 81}}{\sqrt{4x + 12}} = 3$	$(2 - x)^{4/3} = 16$ $\sqrt[7]{x^2 \cdot \sqrt{x^3}} = 2$	$128x^{-6/7} = 2$
WS 09/10	$(4x - 7)^8 = (x + 2)^8$ $\frac{\sqrt[3]{8x^2 - 32}}{\sqrt[3]{27x - 54}} = 2$	$(4x + 8)^{4/5} = 16$ $\frac{\sqrt{x^3 \cdot \sqrt{x}}}{\sqrt[4]{x^5}} = 2$	$64 \cdot x^{-5/3} = 2$
SS 10	$(x - 1)^6 = (-3x + 7)^6$ $\frac{\sqrt{4x^2 - 20x + 24}}{\sqrt{9x - 18}} = \frac{4}{3}$	$(4x - 2)^4 = 10.000$ $\sqrt{x^2 \cdot \sqrt[3]{x^2}} = 16$	$80 \cdot x^{-4/3} = 5$
WS 10/11	$(-2x + 5)^{12} = (-4x + 1)^{12}$ $\frac{\sqrt[5]{2x^2 - 12x + 16}}{\sqrt[5]{2x - 8}} = -1$	$(6x + 9)^{4/3} = 81$ $\sqrt{x \cdot \sqrt[3]{x}} = 4$	$24 \cdot x^{-2/3} = 6$
SS 11	$(2x - 1)^6 = (x - 5)^6$ $\frac{\sqrt{9x^2 - 27x + 18}}{\sqrt{16x - 32}} = \frac{3}{2}$	$(2x - 4)^{2/3} = 4$ $\frac{\sqrt{x^3 \cdot \sqrt{x^3}}}{\sqrt[4]{x}} = 4$	$80 \cdot x^{-4/5} = 5$
WS 11/12	$(-3x + 2)^{10} = (x + 2)^{10}$ $\frac{\sqrt[4]{2x^2 + 2x - 12}}{\sqrt[4]{32x - 64}} = 1$	$(16x + 16)^{6/5} = 64$ $\sqrt[4]{x^2} = 2$	$48 \cdot x^{-3/5} = 6$

SS 12	$(3x - 2)^6 = (5x - 6)^6$ $\frac{\sqrt[3]{16x^2 - 48x + 32}}{\sqrt[3]{2x - 4}} = 4$	$(8x - 16)^{2/5} = 4$ $\sqrt{x} = -1$	$32 \cdot x^{-5/2} = 1$
WS 12/13	$(x + 2)^{12} = (4x - 7)^{12}$ $\frac{\sqrt{12x^2 - 12x - 72}}{\sqrt{3x + 6}} = 2$	$(-2x + 28)^{4/5} = 16$ $\sqrt[4]{x^3} = 8$	$96 \cdot x^{-4/3} = 6$
SS 13	$(3x - 2)^{10} = (x - 6)^{10}$ $\frac{\sqrt[4]{8x^2 - 56x + 96}}{\sqrt[4]{(x - 4)/2}} = 4$	$(6x + 3)^{4/3} = 81$ $\sqrt{x^2} = 3$	$64 \cdot x^{-4/5} = 4$
WS 13/14	$(-6x + 7)^8 = (-4x + 3)^8$ $\frac{\sqrt{x^2 - 1}}{\sqrt{x - 1}} = 1$	$(6x - 3)^{4/3} = 81$ $\sqrt{x \cdot \sqrt[3]{x}} = 4$	$16 \cdot x^{-5/6} = \frac{1}{2}$
SS 14	$(6x - 3)^6 = (4x - 7)^6$ $\frac{\sqrt{4x^2 + 4x - 8}}{\sqrt{9x + 18}} = 2$	$(18x + 9)^{-2/3} = \frac{1}{9}$ $\sqrt[3]{x \cdot \sqrt{x}} = 4$	$4 \cdot x^{-2/5} = -1$
WS 14/15	$(5x + 11)^{10} = (8x + 2)^{10}$ $\frac{\sqrt[3]{16x^2 - 64x + 48}}{\sqrt[3]{2x - 6}} = 4$	$(4x - 8)^{2/5} = 4$ $\sqrt[6]{x^2} = 2$	$27 \cdot x^{-4/3} = \frac{1}{3}$
SS 15	$(10x - 13)^{12} = (7x - 4)^{12}$ $\frac{\sqrt[4]{3x^2 + 12x + 9}}{\sqrt[4]{3x + 9}} = 2$	$(4x + 12)^{4/5} = 16$ $\sqrt[4]{x \cdot \sqrt[3]{x}} = 2$	$5 \cdot x^{-2/3} = \frac{1}{5}$
WS 15/16	$(x + 6)^6 = (3x + 2)^6$ $\frac{\sqrt[5]{2x^2 - 10x + 12}}{\sqrt[5]{64x - 192}} = \frac{1}{2}$	$(2x + 4)^{-2/3} = \frac{1}{4}$ $\sqrt[5]{x^2 \cdot \sqrt{x}} = 2$	$4 \cdot x^{-3/4} = \frac{1}{2}$
SS 16	$(x + 14)^{10} = (5x - 2)^{10}$ $\frac{\sqrt[3]{-x^2 + 6x - 5}}{\sqrt[3]{8x - 40}} = -\frac{1}{2}$	$2 - (2x + 3)^{-4/5} = 1$ $\frac{\sqrt{x \cdot \sqrt[3]{x}}}{\sqrt[6]{x^2}} = 2$	$2 \cdot x^{-2/3} = \sqrt[3]{2}$
WS 16/17	$(-7x + 17)^4 = (2x + 8)^4$ $\frac{\sqrt[4]{6x^2 - 30x + 24}}{\sqrt[4]{3x - 12}} = 2$	$(2x + 8)^{-2/5} + 2 = \frac{9}{4}$ $\sqrt[4]{x^2 \cdot \sqrt[3]{x^6}} = 2$	$2 \cdot x^{-5/4} = \frac{1}{16}$
SS 17	$(-2x + 7)^{10} = (x - 2)^{10}$ $\frac{\sqrt{2x^2 + 2x - 12}}{\sqrt{\frac{x}{2} - 1}} = 2$	$3 - 8 \cdot (4x - 20)^{-2/3} = 1$ $\frac{x}{\sqrt[3]{x \cdot \sqrt{x}}} = 2$	$\frac{8}{x \cdot \sqrt{x}} = \frac{1}{8}$

WS 17/18	$(5x - 6)^{10} = (3x - 2)^{10}$	$(x + 2)^{-4/5} + 3 = \frac{49}{16}$	$3 \cdot x^{-3/4} = \sqrt[4]{3}$
	$\frac{\sqrt[3]{x^3 - 1}}{\sqrt[3]{x - 1}} = 1$	$\sqrt[4]{\sqrt[3]{x^6}} = 2$	
SS 18	$(6x + 7)^8 = (4x + 3)^8$	$(x - 2)^{-2/3} + 2 = \frac{9}{4}$	$8 \cdot \frac{x^{-1/3}}{x} = \frac{1}{2}$
	$\frac{\sqrt[4]{2x^2 - 12x + 10}}{\sqrt[4]{8x - 40}} = 1$	$\sqrt{2x \cdot \sqrt[3]{2x}} = 4$	
WS 18/19	$(6x - 7)^6 = (4x - 3)^6$	$(6x - 3)^{2/3} + 1 = 10$	$\frac{x^{3/5}}{x} = -4$
	$\frac{\sqrt[3]{16x^2 - 48x + 32}}{\sqrt[3]{2x - 4}} = 4$	$\sqrt{\frac{x}{\sqrt[3]{x}}} = 2$	

Aufgabe 5: Bestimmen Sie jeweils die erste Ableitung der folgenden Funktionen.

Probe1	$f(x) = e^{x^2+1} \cdot (3x - 4)^6$	$f(x) = \frac{1}{\sqrt[3]{8x^3 + 1}}$	$f(x) = \frac{\ln(x^3 + 1)}{(x^2 + 1)^3}$
	$f(x) = \sin(\ln(e^{3x+1} - 3x + 1))$	$f(x) = x^4 \cdot 4^x$	
Probe2	$f(x) = e^{\sin(x)} \cdot (x^2 - 1)^5$	$f(x) = \frac{1}{\sqrt[5]{x^3 + 1}}$	$f(x) = \frac{(4x - 1)^3}{\ln(x^4 + 1)}$
	$f(x) = \cos(e^{3x^2-1} - \ln(x))$	$f(x) = 4^{x^4}$	
WS 07/08	$f(x) = e^{3x+1} \cdot (2x - 3)^4$	$f(x) = \frac{1}{\sqrt[4]{x^4 + 1}}$	$f(x) = \frac{\ln(x^2+1)}{(3x-4)^5}$
	$f(x) = \sin(\ln(e^{3x} + 2x + 1))$	$f(x) = 2^x \cdot (x^3 + 4^x)$	
SS 08	$f(x) = e^{4x-1} \cdot (x^2 - 1)^3$	$f(x) = \frac{1}{\sqrt[6]{2x^3 + 1}}$	$f(x) = \frac{\ln(e^x + 1)}{(2x+1)^3}$
	$f(x) = \cos(e^{x \cdot \ln(x)})$	$f(x) = 3^x \cdot (x^2 + e^x)$	
WS 08/09	$f(x) = e^{-x} \cdot (4x + 5)^6$	$f(x) = \frac{1}{\sqrt[3]{2x^3 + 1}}$	$f(x) = \ln\left(\frac{3^x}{x^3}\right)$
	$f(x) = \sin(e^{2x+\sin(x)})$	$f(x) = 5^{x+1} \cdot (x + 1)^5$	
SS 09	$f(x) = e^{2-x^2} \cdot (3 - 2x)^5$	$f(x) = \frac{1}{\sqrt[5]{x^5 + 1}}$	$f(x) = \frac{\ln(x^4 + 1)}{(x^2 + 1)^3}$
	$f(x) = \cos(2^{3x+1} + 4x + 5)$	$f(x) = 5^{5x^2+5}$	
WS 09/10	$f(x) = e^{(2x-1)^2} \cdot (3x + 1)^4$	$f(x) = \frac{1}{\sqrt[4]{3x^4 + 1}}$	$f(x) = \frac{\ln(2^x + 1)}{(3x + 1)^2}$
	$f(x) = \sin(e^{\sin(e^x)})$	$f(x) = 2^{3^x}$	
SS 10	$f(x) = e^{g(x)} \cdot g(x)$	$f(x) = \frac{1}{\sqrt[3]{4x^4 + 1}}$	$f(x) = \frac{\ln(g(x))}{(g(x))^2}$
	$f(x) = \sin(\sin(e^{3x} + 3x))$	$f(x) = 3^{x^3+3^x}$	

WS 10/11	$f(x) = e^{-x^2} \cdot (-2x + 1)^3$	$f(x) = \frac{1}{\sqrt[5]{(2x+1)^3}}$	$f(x) = \frac{\ln(e^{2x} + 1)}{(x^2 + 1)^3}$
	$f(x) = \sin(\ln(2^{3x} + 1))$	$f(x) = 4^{4x^2}$	
SS 11	$f(x) = e^{2x+1} \cdot (x^2 + 1)^3$	$f(x) = \frac{1}{\sqrt[3]{\sin(x^2)}}$	$f(x) = \frac{\ln(e^x + x)}{(x^3 + 1)^2}$
	$f(x) = 2^{g(x)} \cdot g(x)^2$	$f(x) = e^{e^{2x+1}}$	
WS 11/12	$f(x) = e^{2-3x} \cdot (2-3x)^5$	$f(x) = \frac{1}{\sqrt[5]{g(x)^3}}$	$f(x) = \ln(x^5 \cdot 5^x)$
	$f(x) = e^{g(x)} \cdot g(x)^5$	$f(x) = 2^{3^{g(x)}}$	
SS 12	$f(x) = e^{\sin(x)} \cdot \sin(e^x)$	$f(x) = \frac{1}{\sqrt[3]{(2x-1)^2}}$	$f(x) = \ln\left(\frac{x^2-1}{x^2+1}\right)$
	$f(x) = \cos(\ln(2^{\sin(x^2)}))$	$f(x) = x^{2x}$	
WS 12/13	$f(x) = e^{2x+3} \cdot (2x+3)^n$	$f(x) = \frac{1}{\sqrt[3]{(3x-2)^n}}$	$f(x) = \frac{\ln(x^2+1)}{(x^2+1)^2}$
	$f(x) = \sin(e^{g(x)^2})$	$f(x) = \sqrt[x]{x}$	
SS 13	$f(x) = e^{ax^2} \cdot (3x+4)^5$	$f(x) = \frac{1}{\sqrt[n]{(3x+4)^5}}$	$f(x) = \ln\left(\frac{x \cdot e^x}{(x+1)^3}\right)$
	$f(x) = \sin(\ln(e^{x^2} + 1))$	$f(x) = x^{x^2}$	
WS 13/14	$f(x) = e^{a^2x} \cdot (3x-2)^2$	$f(x) = \frac{1}{\sqrt[4]{(5x+6)^7}}$	$f(x) = \ln\left(\frac{a \cdot x^3}{3^x}\right)$
	$f(x) = 2^{\sin(3^x)}$	$f(x) = (x^2+1)^{(x^2+1)}$	
SS 14	$f(x) = e^{a-2x} \cdot (a-2x)^3$	$f(x) = \frac{1}{\sqrt[4]{x^{2n}+1}}$	$f(x) = \ln\left(\frac{e^{2x+1}}{x^5}\right)$
	$f(x) = (\sin(\ln(x^4+1)) + 1)^4$	$f(x) = x^{2^x}$	
WS 14/15	$f(x) = e^{ax+b} \cdot (ax+b)^2$	$f(x) = \frac{1}{\sqrt[3]{2^x}}$	$f(x) = \ln\left(\frac{3^x \cdot x^3}{e^x}\right)$
	$f(x) = \cos(\ln(g(x)))$	$f(x) = 2^{x^2+x}$	
SS 15	$f(x) = e^{x^2-a^2} \cdot (x^2-a^2)$	$f(x) = \frac{1}{\sqrt[n]{(x^2+1)^2}}$	$f(x) = \ln\left(\frac{e^{x+1} + e^x}{e^{x+1} - e^x}\right)$ (vereinfachen)
	$f(x) = (\sin(2^{g(x)}))^3$	$f(x) = x^{x+e^x}$	
WS 15/16	$f(x) = e^{g(x)} \cdot g(x)$	$f(x) = \frac{1}{\sqrt{(\sqrt{x}+1)^3}}$	$f(x) = \ln\left(\frac{a^2 \cdot 3^x}{e^x \cdot x^3}\right)$ (vereinfachen)
	$f(x) = \sin(\ln(e^{x^2} + 1))$	$f(x) = x^{\sin(x)}$	
SS 16	$f(x) = 2x \cdot \sin(2x) \cdot e^{2x}$	$f(x) = \frac{1}{\sqrt[3]{(2x+1)^n}}$	$f(x) = \ln\left(\frac{a \cdot e^{x^2}}{x \cdot 2^x}\right)$ (vereinfachen)
	$f(x) = 2^{\sin(\ln(x^2+1))}$	$f(x) = (\sin(x))^{\sin(x)}$	

WS 16/17	$f(x) = \frac{e^{2x} \cdot 3x}{4x + 1}$	$f(x) = \frac{2}{\sqrt[n]{(x^3 + 2x)^4}}$	$f(x) = \ln\left(\frac{x^3 \cdot 3^a}{e^x \cdot \sqrt{2x + 1}}\right)$ (vereinfachen)
	$f(x) = (e^{\cos(x^4 + x^2)})^3$	$f(x) = g(x)^{(ax + b)}$	
SS 17	$f(x) = \frac{e^{ax}}{x \cdot \sqrt{x}}$	$f(x) = \frac{4}{\sqrt{(x^2 + x)^n}}$	$f(x) = \ln\left(\frac{x^5 \cdot e^{2x+1}}{a^3 \cdot \sqrt[3]{4x + 1}}\right)$ (vereinfachen)
	$f(x) = \sin(e^{\sin(g(x))})$	$f(x) = (ax + b)^{g(x)}$	
WS 17/18	$f(x) = \frac{\ln(2x + 1) \cdot (2x + 1)}{3x + 1}$	$f(x) = \frac{3}{\sqrt[5]{(x^2 + 2x)^6}}$	$f(x) = \ln\left(\frac{x \cdot 2^x}{e^a \cdot \sqrt[4]{4x + 1}}\right)$ (vereinfachen)
	$f(x) = 3^{\sin(x \cdot \ln(x))}$	$f(x) = x^{\ln(x)}$	
SS 18	$f(x) = \frac{e^{2x+1} \cdot (2x+1)}{4x + 1}$	$f(x) = \frac{3}{\sqrt[3]{(x^3 - 3x)^n}}$	$f(x) = \ln\left(\frac{x^b \cdot 4^{ax}}{b^a \cdot \sqrt[5]{5x + 1}}\right)$ (vereinfachen)
	$f(x) = \sin((e^{2x+1} + \ln(x^2 + 1))^3)$		$f(x) = x^{\sqrt{x}}$ ($f'(x) = 0$?)
WS 18/19	$f(x) = e^{ax^2 + b} \cdot (ax^2 + b)$	$f(x) = \frac{5}{\sqrt[n]{(x^2 - x)^2}}$	$f(x) = \ln\left(\frac{5 \cdot e^{4x+3}}{2^a \cdot \sqrt[3]{3x + 1}}\right)$ (vereinfachen)
	$f(x) = \sin(\ln(\sin(x^2 + 1)))$	$f(x) = g(x)^{g(x)}$	

Aufgabe 6: Bestimmen Sie – sofern existent – die globalen Extrema der folgenden Funktionen.

Probe1	$f(x) = \begin{cases} f_1(x) = \frac{2x-1}{x-1} & \text{für } x \leq 0 \\ f_r(x) = x^3 - 3x^2 - 9x + 1 & \text{für } x > 0 \end{cases}$
Probe2	$f(x) = \begin{cases} f_1(x) = 2^{x^2 - 2x + 2} & \text{für } 0 \leq x < 2 \\ f_r(x) = \frac{2x^2 + 12}{x^2 + 1} & \text{für } 2 \leq x \leq 3 \end{cases}$
WS 07/08	$f(x) = \begin{cases} f_1(x) = x^3 + 3x^2 - 9x + 1 & \text{für } 0 \leq x \leq 2 \\ f_r(x) = \frac{2x^2 + 7}{x^2 + 1} & \text{für } x > 2 \end{cases}$
SS 08	$f(x) = \begin{cases} f_1(x) = x \cdot e^{2-x} & \text{für } 0 \leq x < 2 \\ f_r(x) = 3 - \frac{x-2}{x+2} & \text{für } x \geq 2 \end{cases}$
WS 08/09	$f(x) = \begin{cases} f_1(x) = \frac{3x+1}{x-3} & x \leq -2 \\ f_2(x) = \frac{1}{4}x^4 - \frac{9}{2}x^2 + 15 & \text{für } -2 < x < 2 \\ f_3(x) = \frac{3x-1}{x+3} & x \geq 2 \end{cases}$
SS 09	$f(x) = \begin{cases} f_1(x) = 2 + \frac{6x-5}{3x-4} & \text{für } x \leq 1 \\ f_r(x) = 3 - e^{-x^2 + 4x - 3} & \text{für } x > 1 \end{cases}$
WS 09/10	$f(x) = \begin{cases} f_1(x) = 2 - \frac{x^2 - 4}{x^2 + 4} & \text{für } x \leq 0 \\ f_r(x) = 3^{-x^2 + 2x + 1} & \text{für } x > 0 \end{cases}$
SS 10	$f(x) = \begin{cases} f_1(x) = x \cdot e^{2-x} & \text{für } 0 \leq x \leq 2 \\ f_2(x) = 3 + \frac{x^2 - 9x + 14}{x^2 - 1} & \text{für } x > 2 \end{cases}$

WS 10/11 $f(x) = \begin{cases} f_1(x) = 3 - \frac{4x-1}{2x-1} & \text{für } x \leq 0 \\ f_2(x) = 2^{-x^2+2x} & \text{für } x > 0 \end{cases}$

SS 11 $f(x) = \begin{cases} f_1(x) = \frac{4x}{x^2+1} - 1 & \text{für } x < 1 \\ f_2(x) = (x-1)^2 \cdot e^{3-x} & \text{für } x \geq 1 \end{cases}$

WS 11/12 SS 09

SS 12 $f(x) = \begin{cases} f_1(x) = (x-1)^2 \cdot e^{-x^2+2x} & \text{für } 0 \leq x \leq 2 \\ f_2(x) = \frac{5x-10}{x^2+5} + 1 & \text{für } x > 2 \end{cases}$

WS 12/13 $f(x) = \begin{cases} f_1(x) = \frac{2x}{x^2+1} & \text{für } x < 0 \\ f_2(x) = x^2 \cdot e^{2-x} & \text{für } x \geq 0 \end{cases}$

SS 13 $f(x) = \begin{cases} f_1(x) = \frac{2x}{x-2} + 1 & x \leq -2 \\ f_2(x) = -\frac{1}{4}x^4 + 2x^2 - 2 & \text{für } -2 < x < 1 \\ f_3(x) = \frac{2x+2}{x^2+3} & x \geq 1 \end{cases}$

WS 13/14 $f(x) = \begin{cases} f_1(x) = \frac{2x-5}{x-4} + 2 & \text{für } x < 3 \\ f_2(x) = (x-3)^2 \cdot e^{5-x} & \text{für } x \geq 3 \end{cases}$

SS 14 $f(x) = \begin{cases} f_1(x) = \frac{2-x}{1-x} & x \leq 0 \\ f_2(x) = \frac{1}{3}x^3 - 2x^2 + 4x + 2 & \text{für } 0 < x < 3 \\ f_3(x) = 6 - e^{3-x} & x \geq 3 \end{cases}$

WS 14/15 $f(x) = \begin{cases} f_1(x) = (x-2)^2 \cdot e^{-x^2+4x} & \text{für } 0 \leq x \leq 4 \\ f_2(x) = \frac{3x-10}{x-3} + 2 & \text{für } x > 4 \end{cases}$, Hinweis: $e^3 \approx 20$

SS 15 $f(x) = \frac{x-2}{(x-1)^2}$

WS 15/16 $f(x) = \begin{cases} f_1(x) = \frac{x^2-1}{x^2+1} & x \leq 0 \\ f_2(x) = -\frac{1}{4}(x+1) \cdot (x-2)^2 & \text{für } 0 < x < 4 \\ f_3(x) = (3-x) \cdot e^{4-x} & x \geq 4 \end{cases}$

SS 16 $f(x) = \begin{cases} f_1(x) = \frac{4}{(x-1)^2} & \text{für } 0 \leq x \leq 3 \\ f_2(x) = (3-x) \cdot e^{4-x} & \text{für } x > 3 \end{cases}$

WS 16/17 $f(x) = \begin{cases} f_1(x) = \frac{x^3+4}{x^3-1} & x \leq 0 \\ f_2(x) = -\frac{1}{4} \cdot (x^2-4)^2 & \text{für } 0 < x < 2 \\ f_3(x) = (2-x) \cdot e^{3-x} & x \geq 2 \end{cases}$

SS 17 $f(x) = \begin{cases} f_1(x) = \frac{-4}{(x-2)^2} & \text{für } 0 \leq x < 4 \\ f_2(x) = (8-2x) \cdot e^{5-x} & \text{für } x \geq 4 \end{cases}$

WS 17/18 $f(x) = \begin{cases} f_1(x) = \ln(1+x) - 1 & 0 \leq x < e-1 \\ f_2(x) = (e-1-x) \cdot e^{e-x} & \text{für } x \geq e-1 \end{cases}$

$$f(x) = \begin{cases} f_1(x) = \frac{2x^2 + 9}{x^2 + 1} & x \leq 0 \\ f_2(x) = x^3 - 12x + 15 & \text{für } 0 < x \leq 3 \\ f_3(x) = (1 - x) \cdot e^{3-x} & x > 3 \end{cases}$$

SS 18

WS 18/19

WS 13/14

Aufgabe 7: Bestimmen Sie die Lösungsmengen der 3 folgenden – in Tableauform gegebenen – linearen Gleichungssysteme.

Probe1	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & 2 & 1 & 4 \\ 2 & 0 & 3 & 6 \\ 1 & -2 & 5 & 7 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 1 & 0 & 2 & 4 \\ -2 & 1 & 1 & 3 \\ 0 & 1 & 5 & 11 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 1 & 2 & 3 & 8 \\ 0 & -1 & 1 & 1 \\ 3 & 2 & -1 & 0 \end{array}$
Probe1	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 0 & 2 & -1 & 2 \\ 1 & -2 & 1 & 0 \\ -1 & 6 & -3 & 4 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 1 & 0 & 2 & 3 \\ 2 & -1 & 3 & 8 \\ 3 & -2 & 4 & 12 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -1 & 0 & 2 \\ 1 & 0 & -3 & -4 \\ 3 & 1 & -2 & 4 \end{array}$
WS 07/08	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 0 & 1 & 7 \\ 3 & 1 & -1 & 10 \\ 1 & 1 & 1 & 6 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -2 & 1 & 0 & -4 \\ -1 & 2 & 1 & 2 \\ 0 & 3 & 2 & 6 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -1 & 3 & 1 & 4 \\ 0 & 1 & -2 & 0 \\ 2 & -5 & -4 & -8 \end{array}$
SS 08	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 1 & 2 & 3 & 6 \\ 2 & 1 & 1 & 4 \\ 5 & 4 & 5 & 13 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 4 & 9 \\ 3 & -1 & 2 & 4 \\ 1 & 7 & 6 & 14 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 4 & -1 \\ 3 & 4 & 2 & 2 \\ 4 & 3 & 2 & 1 \end{array}$
WS 08/09	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -2 & 1 & 4 \\ 2 & 1 & -1 & 4 \\ 7 & 7 & -6 & 16 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -1 & 0 & 2 \\ -4 & 3 & 2 & 2 \\ 3 & -1 & 1 & 5 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & 0 & 1 & 8 \\ 1 & 3 & -2 & 4 \\ -1 & 1 & -1 & -2 \end{array}$
SS 09	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -2 & -3 & -4 \\ -3 & 2 & 2 & -2 \\ 1 & -2 & -4 & -8 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -2 & -3 & -4 \\ -3 & 2 & 2 & -2 \\ -4 & 2 & 1 & -8 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -2 & -3 & -4 \\ -3 & 2 & 2 & -2 \\ 0 & 1 & -1 & 1 \end{array}$
WS 09/10	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 1 & 0 & 4 \\ 4 & 3 & 2 & 11 \\ 3 & 2 & 1 & 8 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 4 & 7 \\ 3 & 4 & 5 & 10 \\ 4 & 1 & 1 & 9 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 4 & 7 \\ 3 & 4 & 5 & 10 \\ 2 & 1 & 0 & 5 \end{array}$
SS 10	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -2 & 5 & 2 \\ 4 & -1 & 3 & -1 \\ 2 & 2 & 1 & -1 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -2 & 3 & 4 & 6 \\ 3 & 1 & -1 & -4 \\ 1 & 4 & 3 & 2 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -4 & 1 & -1 \\ -3 & 0 & 2 & 5 \\ 3 & -12 & 5 & 3 \end{array}$
WS 10/11	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -2 & 2 & -1 & -2 \\ 3 & 3 & -4 & -1 \\ 5 & -4 & 2 & 6 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 4 & 16 \\ 4 & -3 & 2 & 8 \\ -2 & 6 & 2 & 9 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -2 & 2 & 7 \\ 4 & -3 & 2 & 8 \\ 10 & -7 & 6 & 22 \end{array}$
SS 11	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -2 & 2 & 4 \\ -4 & 5 & 4 & -3 \\ 5 & -7 & 6 & 3 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -3 & 4 & 2 & -2 \\ 5 & -3 & 4 & 7 \\ 2 & 1 & 6 & 4 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 5 & -6 & 3 & 4 \\ 4 & -5 & 0 & 3 \\ 6 & -7 & 6 & 5 \end{array}$
WS 11/12	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 12 \\ -3 & 3 & 1 & -4 \\ 1 & -3 & 9 & 20 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 12 \\ -3 & 3 & 2 & -2 \\ 2 & -3 & -2 & 0 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 12 \\ -3 & 2 & 2 & -2 \\ 0 & -5 & 16 & 30 \end{array}$

SS 12	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 4 & 8 \\ 3 & 2 & 2 & 7 \\ 5 & 0 & -2 & 5 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & 4 & 5 & 11 \\ 4 & 2 & 3 & 8 \\ 5 & 6 & 7 & 17 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 2 & 8 \\ 4 & 2 & 3 & 8 \\ 2 & 7 & 3 & 17 \end{array}$
WS 12/13	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & 2 & 2 & 21 \\ 4 & 3 & -2 & 15 \\ 5 & -4 & 2 & 9 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 2 & 14 \\ 3 & 2 & 4 & 18 \\ 5 & 5 & 6 & 30 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 2 & 3 & 7 \\ 3 & 3 & 2 & 8 \\ 4 & 4 & 1 & 9 \end{array}$
SS 13	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 2 & 3 \\ -5 & 4 & 5 & -2 \\ -7 & 4 & 12 & 0 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 2 & 3 \\ 4 & -3 & -2 & 4 \\ 3 & -5 & 4 & 3 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 2 & 3 \\ 4 & -5 & 4 & 6 \\ -2 & 3 & 2 & 2 \end{array}$
WS 13/14	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 4 & -2 & 3 & 11 \\ 2 & 3 & -2 & 10 \\ 2 & -4 & 1 & -1 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 3 & 4 \\ 5 & -3 & 3 & 12 \\ 2 & 1 & 0 & 9 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -5 & 6 & 2 \\ 4 & -3 & 2 & 8 \\ 2 & 2 & -4 & 6 \end{array}$
SS 14	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 7 \\ 5 & -6 & 7 & 16 \\ 4 & -3 & 2 & 11 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 7 \\ 3 & -4 & 2 & 4 \\ 5 & -6 & -2 & -1 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 7 \\ 5 & -6 & 7 & 16 \\ 4 & -3 & -3 & 1 \end{array}$
WS 14/15	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 2 & 2 \\ 3 & 2 & -4 & 9 \\ 8 & 1 & -6 & 20 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & 3 & -4 & 4 \\ 2 & 3 & -2 & 6 \\ 4 & -3 & 3 & 8 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -2 & 2 & 2 & 0 \\ 3 & -3 & 4 & 1 \\ 4 & -4 & 10 & 3 \end{array}$
SS 15	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & -2 & 2 \\ 5 & -3 & 4 & 9 \\ 8 & -3 & 6 & 20 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & 4 & -2 & 5 \\ -3 & 2 & 3 & 10 \\ 3 & 10 & -1 & 19 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 4 & 5 & -3 & 5 \\ 6 & 2 & -4 & -2 \\ -2 & 3 & -1 & 1 \end{array}$
WS 15/16	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 4 & -5 & 6 & 4 \\ -3 & 4 & -4 & -2 \\ 2 & 7 & 2 & 0 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 5 & -4 & 3 & -4 \\ -3 & 5 & -6 & -6 \\ 8 & -9 & 9 & 2 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 6 & 7 & 8 & 4 \\ 2 & 3 & 5 & 6 \\ 4 & 4 & 3 & 0 \end{array}$
SS 16	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 2 & -1 \\ 3 & -4 & 4 & 2 \\ 12 & -17 & 14 & 0 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -2 & 3 & 6 \\ 5 & 4 & -10 & 2 \\ 27 & 4 & -18 & 30 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline -3 & 2 & -3 & -6 \\ 5 & -3 & 3 & 7 \\ -2 & -3 & 6 & -1 \end{array}$
WS 16/17	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 4 \\ 3 & -2 & -2 & -3 \\ 13 & -12 & 2 & -1 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 4 \\ 6 & -4 & -5 & 5 \\ -2 & 5 & -4 & 0 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & 4 & 4 \\ 3 & -2 & -2 & -3 \\ 7 & -8 & 6 & 6 \end{array}$
SS 17	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 2 & 2 \\ 4 & 2 & -3 & 2 \\ 2 & -10 & 7 & 2 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 1 & -2 \\ -4 & 3 & 2 & 9 \\ 2 & -5 & 4 & 6 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -4 & 3 & 4 \\ -4 & 3 & -2 & -7 \\ -2 & 5 & -4 & -5 \end{array}$
WS 17/18	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 4 & -3 & 14 \\ 3 & 2 & -4 & 10 \\ 4 & -2 & -5 & 0 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -4 & 2 & 4 \\ 4 & -3 & -2 & 3 \\ 13 & -15 & 4 & 16 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 4 & -3 & -3 & -1 \\ 3 & -4 & 3 & 6 \\ 2 & -5 & 9 & 13 \end{array}$
SS 18	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 3 & -2 & -2 & 1 \\ 4 & 3 & -1 & -4 \\ -6 & -13 & -1 & 13 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & 3 & 2 & 2 \\ 5 & -2 & -4 & -3 \\ 11 & 7 & 2 & 3 \end{array}$	$\begin{array}{ccc c} x & y & z & \text{r.S.} \\ \hline 2 & -3 & -3 & -1 \\ 3 & 2 & 3 & 8 \\ -5 & 4 & 6 & 5 \end{array}$

WS 18/19	x	y	z	r.S.	x	y	z	r.S.	x	y	z	r.S.
	3	4	-2	0	2	3	-4	-10	-2	5	-3	-2
	4	-3	2	2	3	-3	1	-2	3	-2	3	8
	1	-7	4	1	5	-6	3	0	4	1	3	14

Aufgabe 8: Bestimmen Sie die Lösungsmengen der beiden folgenden, nichtlinearen Gleichungssysteme.

Probe1	$y^2 = 2x^2 + 1,$	$\frac{x+y}{2x+1} = 1$	$\frac{4x}{y} = x + 3,$	$2y = x + 1$
Probe2	$y^2 = 9 - 2x^2,$	$x + y = 3$	$\frac{2y}{x} + 3x = 5,$	$2x + y = 3$
WS 07/08	$x^2 + 2y^2 = 27,$	$\frac{y-x}{x-9} = 1$	$\frac{x}{y} + 2x = 6,$	$3x + 2y = 8$
SS 08	$x^2 + y^2 = 5,$	$(x-1)^2 + y^2 = 4$	$\frac{2x}{3y} + y = 3,$	$2x + 3 = 9y$
WS 08/09	$3x^2 + y^2 = 4,$	$\frac{y+2x}{x+2} = 1$	$\frac{3x-4}{y} = x - 2,$	$x + y = 2$
SS 09	$x^2 + y^2 = 13,$	$\frac{y+3x+1}{x+3} = 2$	$\frac{6x}{y} + 5x = -6,$	$x + y = 5$
WS 09/10	$3x^2 + 13 = y^2,$	$\frac{y+x}{2x+3} = 1$	$\frac{8-x}{y+1} + x = 6,$	$x = y + 3$
SS 10	$2x^2 + 7 = y^2,$	$\frac{y+2x+1}{x+1} = 3$	$\frac{15-2x}{y+2} + x = 6,$	$x - y = 2$
WS 10/11	$2x^2 + y^2 = 27,$	$\frac{y+2x-1}{x+5} = 1$	$\frac{5x+1}{y+5} - x = -1,$	$y + 3x = 12$
SS 11	$5x^2 + y^2 = 21,$	$\frac{y+5x+1}{x+4} = 2$	$\frac{5x+16}{y+5} - x = 2,$	$x + 3y = 7$
WS 11/12	$3x^2 = 2y^2 + 1,$	$\frac{x-y-2}{x+2y+1} = -2$	$x \cdot y = -1,$	$\frac{2y-x+3}{2x+y-1} = -3$
SS 12	$3x^2 + y^2 = 28,$	$\frac{3y+2x-1}{2y-x+9} = 1$	$\frac{-2x+8}{y-2} - x = 5,$	$x + 3y = 10$
WS 12/13	$5x^2 + y^2 = 36,$	$\frac{4y-x-24}{2x-3y+18} = -1$	$\frac{3(11-x)}{2y+3} + x = 7,$	$3y = x + 2$
SS 13	$x^2 - 2y^2 = 7,$	$\frac{2y-3x+3}{y-2x+1} = 1$	$\frac{27-4x}{y+4} + x = 6,$	$2(y+1) = x + y$
WS 13/14	$x^2 + y^2 = 13,$	$\frac{2x-y-4}{x-2y+1} = 1$	$\frac{2-x}{y-1} + 4 = x,$	$2y + 1 = 2x - 1$
SS 14	$4x^2 + y^2 = 20,$	$\frac{3x+2y-2}{3x-y-8} = -1$	$3 \cdot \frac{x+6}{y+3} - x = 2,$	$\frac{2y-x-4}{y-2x+1} = 1$
WS 14/15	$y^2 = 3x^2 - 11,$	$\frac{y-x+1}{y+x-3} = \frac{1}{2}$	$3 \cdot \frac{x-4}{y-3} + x = 5,$	$2y - 2x + 3 = y - x + 2$
SS 15	$2y^2 = 27 + 5x^2,$	$\frac{3y-4x-8}{2y-3x-5} = 1$	$\frac{31-x}{y+1} + x = 7,$	$\frac{3x-y-3}{2x-y} = 2$
WS 15/16	$x^2 + y^2 = 10,$	$\frac{3x+2y+3}{2x+3y+7} = 1$	$\frac{3x-5}{y-3} + x = 2,$	$\frac{3x-y-2}{x-y} = 2$
SS 16	$y^2 = 13 + 3x^2,$	$\frac{y+x-7}{x-2} = 2$	$4 \cdot \frac{1-x}{y-4} + 6 = x,$	$\frac{3y+x+1}{x+y+2} = 2$
WS 16/17	$x^2 = 7 + 2y^2,$	$\frac{3x-4y-5}{x-2y-1} = 1$	$\frac{2y-15}{x+2} + 6 = y,$	$\frac{5x-3y+4}{3x-y} = 1$
SS 17	$2y + 1 = \frac{9}{x},$	$3x - 1 = \frac{8}{y}$	$\frac{8-2y}{x-2} - y = 5,$	$3x + y = 10$

WS 17/18	$x^2 + y^2 = 13,$	$\frac{2x - 3y}{x - 4y + 5} = 1$	$\frac{x - 4}{y - 3} + \frac{x}{3} = 2,$	$\frac{x + 2y + 2}{2x + y + 1} = 1$
SS 18	$y^2 + 4 = 5x^2$	$\frac{y + 2x - 8}{2y - 3x - 2} = 1$	$\frac{7 - x}{y + 1} + x = 3,$	$\frac{3x + 2y + 1}{2x + 3y - 1} = 1$
WS 18/19	$y^2 + 2 = 3x^2$	$\frac{x - 3y + 2}{3x - 4y + 1} = 1$	$2 \cdot \frac{10 - x}{y + 2} + x = 7,$	$\frac{x + y - 2}{4x + y - 5} = \frac{1}{3}$

Lösungen

Bei allen Aufgaben muss der Rechenweg erkennbar sein (auch beim Bruchrechnen mindestens 1 Zwischenschritt). Ohne Rechnung gibt es auch bei richtigem Ergebnis keine Punkte.

Aufgabe 1

Probe1	2,3	1,6	101	0,1	20	1	$\frac{5}{6}$	6	2,5	40
Probe2	0,8	1,7	2002	10	20	50	$\frac{1}{14}$	8	3000	300
WS 07/08	2,1	1,3	101	3	20	1	$\frac{5}{6}$	13	50	25
SS 08	2,4	1,9	202	6	40	50	$\frac{5}{6}$	9	250	5
WS 08/09	0,8	1,3	330	15	15	1	$\frac{5}{6}$	8	25	30
SS 09	1,6	1,7	1010	3	30	3	10	8	400	20
WS 09/10	1,7	1,8	201	2	30	2	$\frac{2}{7}$	15	25	30
SS 10	0,9	1,3	101	1	40	3	8	10	35	25
WS 10/11	0,9	1,6	3003	9	30	14	4	5	75	30
SS 11	0,9	1,9	2020	10	40	1	5	10	300	3
WS 11/12	0,7	1,7	7007	7	70	7	7	70	70000	7000
SS 12	1,3	1,7	2002	21	40	20	2	1	25	25
WS 12/13	0,7	1,7	707	7	700	7	$\frac{1}{7}$	70	$\frac{1}{7}$	70
SS 13	2,3	1,6	2020	9	20	49	1	30	25	40
WS 13/14	0,6	1,6	606	60	600	6	0,6	6	$\frac{1}{6}$	60
SS 14	0,9	1,3	202	2	20	3	8	70	35	5
WS 14/15	0,9	1,6	202	10	300	9	5	6	7	4
SS 15	1,6	1,6	6060	6	600	60	60	6	6	600
WS 15/16	1,4	1,7	1001	5	70	1	2	5	70	2
SS 16	1,3	1,3	1001	1	40	2	1	$\frac{1}{3}$	60	5
WS 16/17	0,6	1,3	1010,1	2	30	5	1,5	2	20	70
SS 17	0,75	0,6	101,01	1	40	2	1	1	40	2
WS 17/18	0,75	1,7	70,7	2	400	7	1	70	7	70
SS 18	1,3	1,3	101,01	4	1,3	2	1	3	1,3	13
WS 18/19	$\frac{4}{3}$	1,3	300,3	21	600	20	$\frac{1}{7}$	70	$\frac{1}{6}$	60

Aufgabe 2

Probe1	$\{-1, 3\}$	$\{-2, 0, 2\}$	3	2	$\{-3, 1\}$
Probe2	$\{2, 3\}$	$\{0, 1, 3\}$	± 2	2	$\{-1, 3\}$
WS 07/08	$\{2, 5\}$	$\{-3, 0, 3\}$	± 2	\emptyset	$\{-4, 1\}$
SS 08	$\{2, -3\}$	$\{-2, 0, 2\}$	± 2	4	-1
WS 08/09	$\{2, 3\}$	$\{-2, 0, 2\}$	$\pm \frac{1}{2}$	1	8
SS 09	$\{2, 3\}$	$\{-4, 0, 4\}$	± 1	2	$\{0, 3\}$
WS 09/10	$\{-1, 3\}$	$\{-3, 0, 3\}$	-2	2	± 2
SS 10	$\{2, 3\}$	$\{-5, 0, 5\}$	$\{0, 1\}$	3	1
WS 10/11	$\{-2, 3\}$	$\{-2, 0, 2\}$	$\{-1, 0, 1\}$	-2	1
SS 11	$\{2, 3\}$	$\{-2, 0, 2\}$	$\{-1, 0, 1\}$	3	3
WS 11/12	$\{-4, 3\}$	$\{-2, 0, 3\}$	-1	$\{-1, 3\}$	3
SS 12	$\{-1, 4\}$	$\{-1, 0, 3\}$	$\{0, 1\}$	1	\emptyset
WS 12/13	$\{-2, 4\}$	$\{-1, 0, 2\}$	$\{-1, 0\}$	\emptyset	0
SS 13	$\{2, 4\}$	$\{0, 1, 5\}$	± 1	1	0
WS 13/14	$\{2, 4\}$	$\{0, 2, 3\}$	$\{-1, 0\}$	0	\emptyset
SS 14	$\{2, 4\}$	$\{-2, 0\}$	± 1	-1	0
WS 14/15	$\{-2, 3\}$	± 2	-1	0	\emptyset
SS 15	$\{-3, 2\}$	$\{-2, 0, 3\}$	0	2	-2
WS 15/16	$\{-1, 2\}$	0	$\{-1, 0\}$	\emptyset	$\{0, 1\}$
SS 16	$\{-1, 3\}$	$\{-3, 0, 1\}$	± 1	2	0
WS 16/17	$\{-4, 2\}$	$\{-2, 0, 4\}$	1	1	0
SS 17	$\{-3, 1\}$	± 2	$\{1, 2\}$	2	$\{0, 1\}$
WS 17/18	$\{-1; 3\}$	$\{-1; 0; 3\}$	± 1	0	0
SS 18	$\{-3, 2\}$	$\{-2, 0, 3\}$	± 1	2	0
WS 18/19	$\{-2; 3\}$	$\{0; \pm 2\}$	± 1	1	3

Aufgabe 3

Probe1	$\frac{1}{3}(\ln(a) + 1)$	$\frac{\ln(a)}{\ln(3)} - 1$	$\sqrt[7]{\frac{c-a}{a+b}}$	$\frac{\ln(\frac{c-a}{a+b})}{\ln(2)}$	$\frac{\ln(\frac{c}{a/3+b})}{\ln(3)}$
Probe2	$\pm \sqrt{\ln(a)+4}$	$\frac{\ln(a)}{\ln(2)} + 1$	$\sqrt[3]{\frac{c+2b}{a+b}}$	$\frac{\ln(\frac{c-a+2b}{a+b})}{\ln(4)}$	$\frac{\ln(\frac{4c}{16a+b})}{\ln(4)}$
WS 07/08	$\frac{1}{2}\ln(a) + 2$	$\frac{\ln(a)}{\ln(4)}$	$\sqrt[5]{\frac{b+c}{a+b}}$	$\frac{\ln(\frac{b+c}{a+b})}{\ln(3)}$	$\frac{\ln(\frac{c}{a+2b})}{\ln(2)}$
SS 08	$\frac{1}{3}\ln(a) + 1$	$\frac{\ln(a)}{\ln(5)}$	$\sqrt[3]{\frac{c+a-b}{a+b}}$	$\frac{\ln(\frac{c-a+b}{a+b})}{\ln(2)}$	$\frac{\ln(\frac{c}{9a+b})}{\ln(3)}$
WS 08/09	$\pm \sqrt{\ln(a)}$	$\frac{1}{3}(1 + \frac{\ln(a)}{\ln(2)})$	$\sqrt[3]{\frac{c+a+b}{2a+4b}}$	$\frac{\ln(\frac{c+a+b}{a+2b})}{\ln(4)}$	$\frac{\ln(\frac{b}{1+5^a})}{\ln(5)}$
SS 09	e^{a+1}	$\frac{1}{3}(2 + \frac{\ln(a)}{\ln(10)})$	$\sqrt[5]{\frac{c+2a+b}{3a+2b}}$	$\frac{\ln(\frac{c+2a+b}{3a+2b})}{\ln(5)}$	$b - \ln(e^{-a} + e^a)$
WS 09/10	$\sqrt[3]{1 + \ln(a)}$	$\frac{1}{2}(1 + \frac{\ln(a)}{\ln(3)})$	$\pm \sqrt[4]{\frac{c+2a+3b}{a+2b}}$	$\frac{\ln(\frac{c+2a+3b}{a+2b})}{\ln(2)}$	$\frac{\ln(\frac{4a}{15})}{\ln(2)}$
SS 10	$\pm \sqrt{1 + \ln(1+a)}$	$1 + \frac{1}{4} \cdot \frac{\ln(a)}{\ln(4)}$	$\pm \sqrt[8]{\frac{a-b+c}{2a-3b}}$	$\frac{\ln(\frac{c}{3a-b/3})}{\ln(3)}$	$c - \frac{\ln(4^a + 4^b)}{\ln(4)}$

WS 10/11	$\frac{1}{a} (\ln(c) - b)$	$\pm \sqrt{\frac{\ln(a)}{\ln(2)}}$	$\sqrt[3]{a+b}$	1	$\frac{1}{2}(c - a - b)$
SS 11	$\pm \sqrt[4]{\ln(a+1)+1}$	$\frac{1}{a} (b + \frac{\ln(c)}{\ln(3)})$	$\pm \frac{a}{2}$	$a - \frac{\ln(2)}{\ln(3)}$	$\frac{1}{a-1}$
WS 11/12	$4 - \ln(a-4)$	$\pm \sqrt{1 + \frac{\ln(a)}{\ln(3)}}$	$\sqrt[3]{a+b}$	3	3
SS 12	$1 + \ln(a)$	$\log_a(1+b)$	$\sqrt[5]{2a+b}$	6	a
WS 12/13	$\pm \sqrt{\frac{\ln(b+1)}{a}}$	± 2	$\sqrt[3]{2a+b}$	1	-1
SS 13	$\sqrt[3]{1 + \ln(1+a)}$	2	$\pm \sqrt{a+b}$	1	-1
WS 13/14	$\pm \sqrt{\ln(2)}$	± 1	$\pm \sqrt[4]{2a+b}$	6	3
SS 14	$\ln(\frac{a}{1+b})$	$\pm \sqrt{2 \cdot \log_2(a)}$	$\pm \sqrt{2a+b}$	$a - \log_2(3)$	4
WS 14/15	$1 - \ln(a(b+1))$	$\frac{\ln(a)}{b}$	$\sqrt[5]{3a-2b}$	3	2
SS 15	$\frac{1}{b} \cdot \ln(a-1)$	$b^{-1/a} = \frac{1}{\sqrt[a]{b}}$	$\sqrt[3]{2a-b}$	1	-1
WS 15/16	$a + \ln(b+1)$	2	$\pm \sqrt[4]{3a+b}$	1	$\{-1, 0, 1\}$
SS 16	$\pm \sqrt{b - \ln(a-1)}$	± 2	$\sqrt[3]{2a-b}$	2	5
WS 16/17	$\pm \sqrt{a^2 + \ln(b+1)}$	2	$\pm \sqrt{2a+b}$	1	± 1
SS 17	$1 + \ln(\frac{a+1}{b+1})$	-1	$\sqrt[3]{5a+2b}$	1	3
WS 17/18	$1 - \ln((a+1)(b+2))$	1	$\pm \sqrt{2a+b}$	1	0
SS 18	$b - \ln(\frac{2}{1-a})$	$\{-2, 0\}$	$\pm \sqrt{3a-b}$	± 2	2
WS 18/19	$\sqrt[3]{1 - \ln(a+1)}$	$\pm 2 \cdot \sqrt{\ln(2)+1}$	$\sqrt[3]{2a+b}$	3	± 3

Aufgabe 4

Probe1	$\{-2, 4\}$	5	± 8	4	64
Probe2	$\{-5, 1\}$	$\{-13, 14\}$	32	12	64
WS 07/08	± 1	5	$\pm \frac{1}{8}$	10	16
SS 08	± 1	3	± 32	1	64
WS 08/09	± 1	5	± 32	0	± 8
SS 09	$\{-3, 1\}$	$\{-6, 10\}$	± 128	7	4
WS 09/10	$\{1, 3\}$	$\{-10, 6\}$	8	25	4
SS 10	$\{2, 3\}$	$\{-2, 3\}$	± 8	7	± 8
WS 10/11	$\{-2, 1\}$	$\{-6, 3\}$	± 8	1	± 8
SS 11	$\{-4, 2\}$	$\{-2, 6\}$	± 32	5	2
WS 11/12	$\{0, 2\}$	$\{-3, 1\}$	32	13	± 4
SS 12	$\{1, 2\}$	$\{-2, 6\}$	4	9	\emptyset
WS 12/13	$\{1, 3\}$	$\{-2, 30\}$	± 8	4	16
SS 13	± 2	$\{-5, 4\}$	± 32	19	± 3
WS 13/14	$\{1, 2\}$	$\{-4, 5\}$	64	\emptyset	± 8
SS 14	$\{-2, 1\}$	$\{-2, 1\}$	\emptyset	10	16
WS 14/15	$\{-1, 3\}$	$\{-6, 10\}$	± 27	9	± 8
SS 15	$\{1, 3\}$	$\{-11, 5\}$	± 125	15	± 8
WS 15/16	± 2	$\{-6, 2\}$	16	\emptyset	4
SS 16	$\{-2, 4\}$	$\{-2, -1\}$	± 2	2	± 8

WS 16/17	{1, 5}	{-20, 12}	16	9	± 2
SS 17	{3, 5}	{3, 7}	16	\emptyset	4
WS 17/18	{1, 2}	{-34, 30}	3	{-1; 0}	± 4
SS 18	{-2, -1}	{-6, 10}	± 8	\emptyset	± 4
WS 18/19	{1, 2}	{-4, 5}	\emptyset	9	± 8

Aufgabe 5

Probe1 $f'(x) = f(x) \cdot 2x + e^{x^2+1} \cdot 6 \cdot (3x-4)^5 \cdot 3$ $f'(x) = -\frac{1}{3} \cdot (8x^3 + 1)^{-4/3} \cdot 24x^2$

$$f'(x) = \frac{\frac{3x^2}{x^3+1} \cdot (x^2+1)^3 - \ln(x^3+1) \cdot 3 \cdot (x^2+1)^2 \cdot 2x}{(x^2+1)^6}$$

$$f'(x) = \cos(\ln(e^{3x+1} - 3x + 1)) \cdot \frac{e^{3x+1} \cdot 3 - 3}{e^{3x+1} - 3x + 1} \quad f'(x) = 4x^3 \cdot 4^x + f(x) \cdot \ln(4)$$

Probe2 $f'(x) = f(x) \cdot \cos(x) + e^{\sin(x)} \cdot 5(x^2-1)^4 \cdot 2x$ $f'(x) = -\frac{1}{5} \cdot (x^3+1)^{-6/5} \cdot 3x^2$

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

$$f'(x) = -\sin(e^{3x^2-1} - \ln(x)) \cdot (e^{3x^2-1} \cdot 6x - \frac{1}{x}) \quad f'(x) = 4x^4 \cdot \ln(4) \cdot 4x^3$$

WS 07/08 $f'(x) = 3 \cdot f(x) + e^{3x+1} \cdot 4 \cdot (2x-3)^3 \cdot 2$ $f'(x) = -\frac{1}{4} \cdot (x^4+1)^{-5/4} \cdot 4x^3$

$$f'(x) = \frac{\frac{2x}{x^2+1} \cdot (3x-4)^5 - \ln(x^2+1) \cdot 5 \cdot (3x-4)^4 \cdot 3}{(3x-4)^{10}}$$

$$f'(x) = \cos(\ln(e^{3x} + 2x + 1)) \cdot \frac{e^{3x} \cdot 3 + 2}{e^{3x} + 2x + 1} \quad f'(x) = f(x) \cdot \ln(2) + 2^x \cdot (3x^2 + 4^x \cdot \ln(4))$$

SS 08 $f'(x) = 4 \cdot f(x) + e^{4x-1} \cdot 3 \cdot (x^2-1)^2 \cdot 2x$ $f'(x) = -\frac{1}{6} \cdot (2x^3+1)^{-7/6} \cdot 6x^2$

$$f'(x) = \frac{\frac{e^x}{e^x+1} \cdot (2x+1)^3 - \ln(e^x+1) \cdot 3 \cdot (2x+1)^2 \cdot 2}{(2x+1)^6}$$

$$f'(x) = -\sin(e^{x \cdot \ln(x)}) \cdot e^{x \cdot \ln(x)} \cdot (1 \cdot \ln(x) + x \cdot \frac{1}{x}) \quad f'(x) = f(x) \cdot \ln(3) + 3^x \cdot (2x + e^x)$$

WS 08/09 $f'(x) = f(x) \cdot (-1) + e^{-x} \cdot 6(4x+5)^5 \cdot 4$ $f'(x) = -\frac{1}{3} \cdot (2x^3+1)^{-4/3} \cdot 6x^2$

$$f'(x) = \ln(3) - \frac{3}{x} \quad \text{oder} \quad f'(x) = \frac{x^3}{3^x} \cdot \frac{3^x \cdot \ln(3) \cdot x^3 - 3^x \cdot 3x^2}{x^6}$$

$$f'(x) = \cos(e^{2x+\sin(x)}) \cdot e^{2x+\sin(x)} \cdot (2 + \cos(x)) \quad f'(x) = f(x) \cdot \ln(5) + 5^{x+1} \cdot 5(x+1)^4$$

SS 09 $f'(x) = f(x) \cdot (-2x) + e^{2-x^2} \cdot 5(3-2x)^4 \cdot (-2)$ $f'(x) = -\frac{1}{5} \cdot (x^5+1)^{-6/5} \cdot 5x^4$

$$f'(x) = \frac{4x^3}{x^4+1} \cdot (x^2+1)^{-3} + \ln(x^4+1) \cdot (-3) \cdot (x^2+1)^{-4} \cdot 2x \quad \text{oder}$$

$$f'(x) = \frac{\frac{4x^3}{x^4+1} \cdot (x^2+1)^3 - \ln(x^4+1) \cdot 3 \cdot (x^2+1)^2 \cdot 2x}{(x^2+1)^6}$$

$$f'(x) = -\sin(2^{3x+1} + 4x + 5) \cdot (2^{3x+1} \cdot \ln(2) \cdot 3 + 4) \quad f'(x) = f(x) \cdot \ln(5) \cdot 10x$$

WS 09/10 $f'(x) = e^{(2x-1)^2} \cdot 2 \cdot (2x-1) \cdot 2 \cdot (3x+1)^4 + e^{(2x-1)^2} \cdot 4 \cdot (3x+1)^3 \cdot 3$ $f'(x) = -\frac{1}{4}(3x^4+1)^{-5/4} \cdot 12x^3$

$f'(x) = \frac{2^x \ln(2)}{2^x+1} \cdot (3x+1)^{-2} + \ln(2^x+1) \cdot (-2) \cdot (3x+1)^{-3} \cdot 3$ oder

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

$f'(x) = \cos(e^{\sin(e^x)}) \cdot e^{\sin(e^x)} \cdot \cos(e^x) \cdot e^x$ $f'(x) = 2^{3^x} \cdot \ln(2) \cdot 3^x \cdot \ln(3)$

SS 10 $f'(x) = e^{g(x)} \cdot g'(x) \cdot g(x) + e^{g(x)} \cdot g'(x)$ $f'(x) = -\frac{1}{3}(4x^4+1)^{-4/3} \cdot 16x^3$

$f'(x) = \frac{g'(x)}{g(x)} \cdot (g(x))^{-2} + \ln(g(x)) \cdot (-2) \cdot (g(x))^{-3} \cdot g'(x)$ oder

$f'(x) = \frac{g'(x)}{g(x)} \cdot (g(x))^2 - \ln(g(x)) \cdot 2 \cdot g(x) \cdot g'(x)$
 $(g(x))^4$

$f'(x) = \cos(\sin(e^{3x}+3x)) \cdot \cos(e^{3x}+3x) \cdot (e^{3x} \cdot 3 + 3)$ $f'(x) = f(x) \cdot \ln(3) \cdot (3x^2+3^x \cdot \ln(3))$

WS 10/11 $f'(x) = f(x) \cdot (-2x) + e^{-x^2} \cdot 3 \cdot (-2x+1)^2 \cdot (-2)$ $f'(x) = -\frac{3}{5}(2x+1)^{-8/5} \cdot 2$

$f'(x) = \frac{e^{2x} \cdot 2}{e^{2x}+1} \cdot (x^2+1)^{-3} + \ln(e^{2x}+1) \cdot (-3) \cdot (x^2+1)^{-4} \cdot 2x$ oder

$f'(x) = \frac{e^{2x} \cdot 2}{e^{2x}+1} \cdot (x^2+1)^3 - \ln(e^{2x}+1) \cdot 3 \cdot (x^2+1)^2 \cdot 2x$
 $(x^2+1)^6$

$f'(x) = \cos(\ln(2^{3x}+1)) \cdot \frac{2^{3x} \cdot \ln(2) \cdot 3}{2^{3x}+1}$ $f'(x) = f(x) \cdot \ln(4) \cdot 4^{x^2} \cdot \ln(4) \cdot 2x$

SS 11 $f'(x) = f(x) \cdot 2 + e^{2x+1} \cdot 3(x^2+1)^2 \cdot 2x$ $f'(x) = -\frac{1}{3}(\sin(x^2))^{-4/3} \cdot \cos(x^2) \cdot 2x$

$f'(x) = \frac{e^x+1}{e^x+x} \cdot (x^3+1)^{-2} + \ln(e^x+x) \cdot (-2) \cdot (x^3+1)^{-3} \cdot 3x^2$ oder

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

$f'(x) = f(x) \cdot \ln(2) \cdot g'(x) + 2^{g(x)} \cdot 2 \cdot g(x) \cdot g'(x)$ $f'(x) = f(x) \cdot e^{2x+1} \cdot 2$

WS 11/12 $f'(x) = f(x) \cdot (-3) + e^{2-3x} \cdot 5(2-3x)^4 \cdot (-3)$ $f'(x) = -\frac{3}{5}g(x)^{-8/5} \cdot g'(x)$ $f'(x) = \frac{5}{x} + \ln(5)$

$f'(x) = f(x) \cdot g'(x) + e^{g(x)} \cdot 5 \cdot g(x)^4 \cdot g'(x)$ $f'(x) = f(x) \cdot \ln(2) \cdot 3^{g(x)} \cdot \ln(3) \cdot g'(x)$

SS 12 $f'(x) = f(x) \cdot \cos(x) + e^{\sin(x)} \cdot \cos(e^x) \cdot e^x$ $f'(x) = -\frac{2}{3}(2x-1)^{-5/3} \cdot 2$

$f'(x) = \frac{2x}{x^2-1} - \frac{2x}{x^2+1}$ $f'(x) = -\sin(\sin(x^2) \cdot \ln(2)) \cdot \cos(x^2) \cdot 2x \cdot \ln(2)$

$f'(x) = f(x) \cdot (2 \cdot \ln(x) + 2x \cdot \frac{1}{x})$

WS 12/13 $f'(x) = 2 \cdot f(x) + e^{2x+3} \cdot n \cdot (2x+3)^{n-1} \cdot 2$ $f'(x) = -\frac{n}{3}(3x-2)^{-n/3-1} \cdot 3$

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

$f'(x) = \cos(e^{g(x)^2}) \cdot e^{g(x)^2} \cdot 2 \cdot g(x) \cdot g'(x)$

$$f'(x) = f(x) \cdot \left(-\frac{1}{x^2} \cdot \ln(x) + \frac{1}{x} \cdot \frac{1}{x} \right)$$

SS 13 $f'(x) = f(x) \cdot 2ax + e^{ax^2} \cdot 5(3x+4)^4 \cdot 3$

$$f'(x) = -\frac{5}{n} (3x+4)^{-5/n-1} \cdot 3$$

$$f'(x) = \frac{1}{x} + 1 - \frac{3}{x+1}$$

$$f'(x) = \cos(\ln(e^{x^2} + 1)) \cdot \frac{e^{x^2} \cdot 2x}{e^{x^2} + 1}$$

$$f'(x) = f(x) \cdot (2x \cdot \ln(x) + x^2 \cdot \frac{1}{x})$$

WS 13/14 $f'(x) = f(x) \cdot a^2 + e^{a^2x} \cdot 2(3x-2) \cdot 3$

$$f'(x) = -\frac{7}{4} (5x+6)^{-11/4} \cdot 5$$

$$f'(x) = \frac{3}{x} - \ln(3)$$

$$f'(x) = f(x) \cdot \ln(2) \cdot \cos(3^x) \cdot 3^x \cdot \ln(3)$$

$$f'(x) = f(x) \cdot [2x \cdot \ln(x^2+1) + (x^2+1) \cdot \frac{2x}{x^2+1}]$$

SS 14 $f'(x) = f(x) \cdot (-2) + e^{a-2x} \cdot 3 \cdot (a-2x)^2 \cdot (-2)$

$$f'(x) = -\frac{1}{4} (x^{2n} + 1)^{-5/4} \cdot 2n \cdot x^{2n-1}$$

$$f'(x) = 2 - \frac{5}{x}$$

$$f'(x) = 4 \cdot (\sin(\ln(x^4+1)) + 1)^3 \cdot \cos(\ln(x^4+1) + 1) \cdot \frac{4x^3}{x^4+1}$$

$$f'(x) = f(x) \cdot [2^x \cdot \ln(2) \cdot \ln(x) + 2^x \cdot \frac{1}{x}]$$

WS 14/15 $f'(x) = f(x) \cdot a + e^{ax+b} \cdot 2(ax+b) \cdot a$

$$f'(x) = f(x) \cdot \ln(2) \cdot \left(-\frac{1}{3}\right)$$

$$f'(x) = \ln(3) + \frac{3}{x} - 1$$

$$f'(x) = -\sin(\ln(g(x))) \cdot \frac{g'(x)}{g(x)}$$

$$f'(x) = f(x) \cdot \ln(2) \cdot (2x+1)$$

SS 15 $f'(x) = f(x) \cdot 2x + e^{x^2-a^2} \cdot 2x$

$$f'(x) = -\frac{2}{n} (x^2 + 1)^{-2/n-1} \cdot 2x$$

$$f'(x) = 0$$

$$f'(x) = 3 \cdot (\sin(2^{g(x)}))^2 \cdot \cos(2^{g(x)}) \cdot 2^{g(x)} \cdot \ln(2) \cdot g'(x)$$

$$f'(x) = f(x) \cdot [(1+e^x) \cdot \ln(x) + (x+e^x) \cdot \frac{1}{x}]$$

WS 15/16 $f'(x) = f(x) \cdot g'(x) + e^{g(x)} \cdot g'(x)$

$$f'(x) = -\frac{3}{2} \cdot (x^{1/2} + 1)^{-5/2} \cdot \frac{1}{2} \cdot x^{-1/2}$$

$$f'(x) = \ln(3) - 1 - \frac{3}{x}$$

$$f'(x) = \cos(\ln(e^{x^2} + 1)) \cdot \frac{e^{x^2} \cdot 2x}{e^{x^2} + 1}$$

$$f'(x) = f(x) \cdot [\cos(x) \cdot \ln(x) + \sin(x) \cdot \frac{1}{x}]$$

SS 16 $f'(x) = 2 \cdot [\sin(2x) \cdot e^{2x} + x \cdot \cos(2x) \cdot 2 \cdot e^{2x} + x \cdot \sin(2x) \cdot e^{2x} \cdot 2]$

$$f'(x) = -\frac{n}{3} (2x+1)^{-n/3-1} \cdot 2$$

$$f'(x) = 2x - \frac{1}{x} - \ln(2)$$

$$f'(x) = f(x) \cdot \ln(2) \cdot \cos(\ln(x^2+1)) \cdot \frac{2x}{x^2+1}$$

$$f'(x) = f(x) \cdot [\cos(x) \cdot \ln(\sin(x)) + \sin(x) \cdot \frac{\cos(x)}{\sin(x)}]$$

WS 16/17 $f'(x) = \frac{(e^{2x} \cdot 2 \cdot 3x + e^{2x} \cdot 3) \cdot (4x+1) - e^{2x} \cdot 3x \cdot 4}{(4x+1)^2}$

$$f'(x) = 2 \cdot \left(-\frac{4}{n}\right) \cdot (x^3+2x)^{-4/n-1} \cdot (3x^2+2)$$

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

$$f'(x) = f(x) \cdot 3 \cdot (-\sin(x^4+x^2)) \cdot (4x^3+2x)$$

$$f'(x) = f(x) \cdot [a \cdot \ln(g(x)) + (ax+b) \cdot \frac{g'(x)}{g(x)}]$$

SS 17 $f'(x) = f(x) \cdot a + e^{ax} \cdot (-3/2) \cdot x^{-5/2}$
 $f'(x) = 4 \cdot (-n/2) \cdot (x^2 + x)^{-n/2-1} \cdot (2x + 1)$ $f'(x) = \frac{5}{x} + 2 - \frac{1}{3} \cdot \frac{4}{4x + 1}$
 $f'(x) = \cos(e^{\sin(g(x))}) \cdot e^{\sin(g(x))} \cdot \cos(g(x)) \cdot g'(x)$ $f'(x) = f(x) \cdot [g'(x) \cdot \ln(ax + b) + g(x) \cdot \frac{a}{ax + b}]$

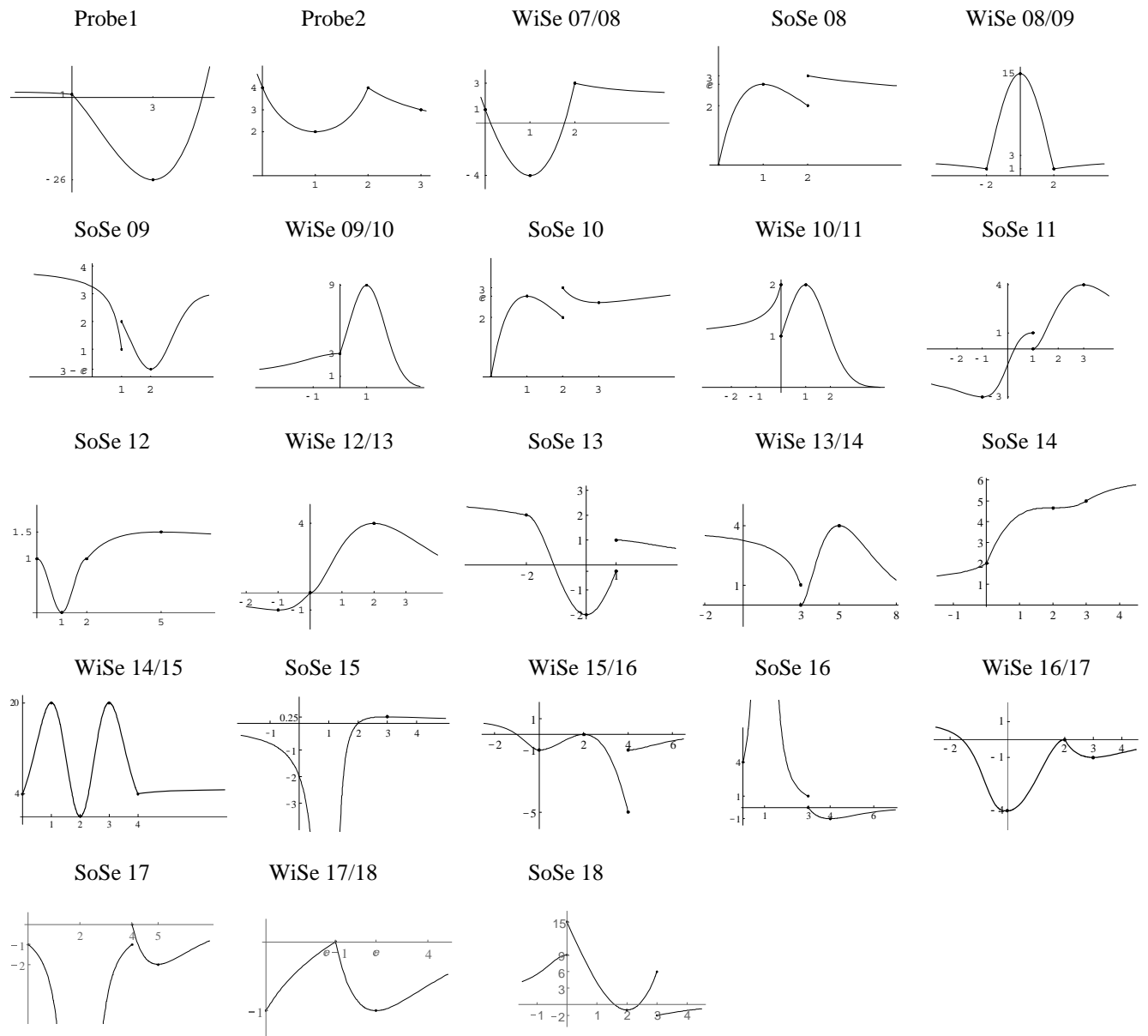
WS 17/18 $f'(x) = \frac{2 \cdot (3x + 1) - \ln(2x + 1)}{(3x + 1)^2}$ $f'(x) = 3 \cdot (-\frac{6}{5}) \cdot (x^2 + 2x)^{-11/5} \cdot (2x + 2)$
 $f'(x) = \frac{1}{x} + \ln(2) - \frac{1}{4x + 1}$ $f'(x) = f(x) \cdot \ln(3) \cdot \cos(x \cdot \ln(x)) \cdot (\ln(x) + 1)$
 $f'(x) = f(x) \cdot 2 \cdot \ln(x) \cdot \frac{1}{x}$

SS 18 $f'(x) = 2 \cdot (f(x) - \frac{e^{2x+1}}{(4x + 1)^2})$ oder $f'(x) = f(x) \cdot (2 + \frac{2}{2x + 1} - \frac{4}{4x + 1})$
 $f'(x) = 3 \cdot (-\frac{n}{3}) \cdot (x^3 - 3x)^{-n/3-1} \cdot (3x^2 - 3)$ $f'(x) = \frac{b}{x} + a \cdot \ln(4) - \frac{1}{5x + 1}$
 $f'(x) = \cos((e^{2x+1} + \ln(x^2 + 1))^3) \cdot 3(e^{2x+1} + \ln(x^2 + 1))^2 \cdot (e^{2x+1} \cdot 2 + \frac{2x}{x^2 + 1})$
 $f'(x) = f(x) \cdot x^{-1/2} \cdot [\frac{1}{2} \cdot \ln(x) + 1] = 0 \Leftrightarrow x = e^{-2}$

WS 18/19 $f'(x) = f(x) \cdot 2ax + e^{ax^2+b} \cdot 2ax$ $f'(x) = 5 \cdot (-\frac{2}{n}) \cdot (x^2 - x)^{-2/n-1} \cdot (2x - 1)$
 $f'(x) = 4 - \frac{1}{3x + 1}$ $f'(x) = \cos(\ln(\sin(x^2 + 1))) \cdot \frac{\cos(x^2 + 1)}{\sin(x^2 + 1)} \cdot 2x$
 $f'(x) = f(x) \cdot [g'(x) \cdot \ln(g(x)) + g(x) \cdot \frac{g'(x)}{g(x)}]$

Aufgabe 6	"Kandidaten"	globales Maximum	globales Minimum
Probe1	$(-\infty, 2), (\infty, \infty), (0, 1), (3, -26)$	-	$(3, -26)$
Probe2	$(0, 4), (3, 3), (2, 4), (1, 2)$	$(0, 4), (2, 4)$	$(1, 2)$
WS 07/08	$(0, 1), (\infty, 2), (2, 3), (1, -4)$	$(2, 3)$	$(1, -4)$
SS 08	$(0, 0), (\infty, 2), (2, 2), (2, 3), (1, e)$	$(2, 3)$	$(0, 0)$
WS 08/09	$(-\infty, 3), (\infty, 3), (-2, 1), (2, 1), (0, 15)$	$(0, 15)$	$(-2, 1), (2, 1)$
SS 09	$(-\infty, 4), (\infty, 3), (1, 1), (1, 2), (2, 3 - e)$	-	$(2, 3 - e)$
WS 09/10	$(-\infty, 1), (\infty, 0), (0, 3), (1, 9)$	$(1, 9)$	-
SS 10	$(0, 0), (\infty, 4), (2, 2), (2, 3), (1, e), (3, 2,5)$	-	$(0, 0)$
WS 10/11	$(-\infty, 1), (\infty, 0), (0, 2), (0, 1), (1, 2)$	$(0, 2), (1, 2)$	-
SS 11	$(-\infty, -1), (\infty, 0), (1, 1), (1, 0), (-1, -3), (3, 4)$	$(3, 4)$	$(-1, -3)$
WS 11/12	SS 09		
SS 12	$(0, 1), (\infty, 1), (2, 1), (1, 0), (5, 1,5)$	$(5, 1,5)$	$(1, 0)$
WS 12/13	$(-\infty, 0), (\infty, 0), (0, 0), (-1, -1), (2, 4)$	$(2, 4)$	$(-1, -1)$
SS 13	$(-\infty, 3), (\infty, 0), (-2, 2), (1, -\frac{1}{4}), (1, 1), (0, -2)$	-	$(0, -2)$
WS 13/14	$(-\infty, 4), (\infty, 0), (3, 1), (3, 0), (5, 4)$	$(5, 4)$	$(3, 0)$
SS 14	$(-\infty, 1), (\infty, 6), (0, 2), (3, 5), (2, 4+\frac{2}{3})$	-	-
WS 14/15	$(0, 4), (\infty, 5), (4, 4), (2, 0), (1, e^3), (3, e^3)$	$(1, e^3), (3, e^3)$	$(2, 0)$
SS 15	$(1, -\infty), (-\infty, 0), (\infty, 0), (3, \frac{1}{4})$	$(3, \frac{1}{4})$	-
WS 15/16	$(-\infty, 1), (\infty, 0), (0, -1), (4, -5), (4, -1), (2, 0)$	-	$(4, -5)$
SS 16	$(1, \infty), (0, 4), (\infty, 0), (3, 1), (3, 0), (4, -1)$	-	$(4, -1)$

WS 16/17	$(-\infty, 1), (\infty, 0), (0, -4), (2, 0), (3, -1)$	-	$(0, -4)$
SS 17	$(2, -\infty), (0, -1), (\infty, 0), (4, -1), (4, 0), (5, -2)$	$(4, 0)$	-
WS 17/18	$(0, -1), (\infty, 0), (e-1, 0), (e, -1)$	$(0, -1), (e, -1)$	$(e-1, 0)$
SS 18	$(-\infty, 2), (\infty, 0), (0, 9), (0, 15), (3, 6), (3, -2), (2, -1)$	$(0, 15)$	$(3, -2)$
WS 18/19	WS 13/14		



Aufgabe 7

Probe1	\emptyset	∞ viele	$(0, 1, 2)$
Probe2	∞ viele	\emptyset	$(2, 2, 2)$
WS 07/08	$(3, 2, 1)$	\emptyset	∞ viele
SS 08	\emptyset	∞ viele	$(0, 1, -1)$
WS 08/09	∞ viele	\emptyset	$(2, 2, 2)$
SS 09	\emptyset	∞ viele	$(4, 3, 2)$
WS 09/10	\emptyset	$(2, 1, 0)$	∞ viele
SS 10	$(-1, 0, 1)$	∞ viele	\emptyset
WS 10/11	$(2, 3, 4)$	\emptyset	∞ viele
SS 11	$(2, 1, 0)$	\emptyset	∞ viele

WS 11/12	∞ viele	(2, 0, 2)	\emptyset
SS 12	∞ viele	(1, 2, 0)	\emptyset
WS 12/13	(3, 3, 3)	\emptyset	∞ viele
SS 13	\emptyset	∞ viele	(3, 2, 1)
WS 13/14	(3, 2, 1)	\emptyset	∞ viele
SS 14	∞ viele	\emptyset	(4, 3, 2)
WS 14/15	∞ viele	(2, 2, 2)	\emptyset
SS 15	$(0, \frac{13}{3}, \frac{11}{2})$	\emptyset	(1 2, 3)
WS 15/16	(-2, 0, 2)	∞ viele	\emptyset
SS 16	\emptyset	∞ viele	(2, 3, 2)
WS 16/17	∞ viele	(3, 2, 1)	\emptyset
SS 17	∞ viele	\emptyset	(2, 3, 4)
WS 17/18	(4, 3, 2)	\emptyset	∞ viele
SS 18	\emptyset	∞ viele	(1, -2, 3)
WS 18/19	\emptyset	(0, 2, 4)	∞ viele

Aufgabe 8

Probe1	{(0, 1), (2, 3)}	{(1, 1), (3, 2)}
Probe2	{(0, 3), (2, 1)}	{(1, 1), (2, -1)}
WS 07/08	{(3, -3), (5, 1)}	{(2, 1), (4, -2)}
SS 08	{(1, 2), (1, -2)}	{(3, 1), (-6, -1)}
WS 08/09	{(0, 2), (1, 1)}	{(0, 2), (1, 1)}
SS 09	{(2, 3), (3, 2)}	{(-1, 6), (6, -1)}
WS 09/10	{(1, 4), (2, 5)}	{(4, 1), (5, 2)}
SS 10	{(1, 3), (3, 5)}	{(5, 3), (3, 1)}
WS 10/11	{(1, 5), (3, 3)}	{(2, 6), (3, 3)}
SS 11	{(1, 4), (2, 1)}	{(4, 1), (1, 2)}
WS 11/12	{(-1, 1)}	{(-1, 1)}
SS 12	{(2, 4), (3, 1)}	{(1, 3)}
WS 12/13	{(2, 4)}	{(1, 1), (4, 2)}
SS 13	{(5, 3), (3, 1)}	{(5, 3), (3, 1)}
WS 13/14	{(2, 3)}	{(3, 2)}
SS 14	{(1, 4)}	{(1, 4)}
WS 14/15	{(3, 4)}	{(2, 1)}
SS 15	{(3, 6)}	{(1, 4)}
WS 15/16	{(3, -1)}	{(3, -1)}
SS 16	{(1, 4)}	{(2, 5)}
WS 16/17	{(5, 3)}	{(3, 5)}
SS 17	{(1, 4), (3, 1)}	{(3, 1)}
WS 17/18	{(2, 3)}	{(3, 2)}
SS 18	{(1, -1)}	{(2, 4)}
WS 18/19	{(3, 5)}	{(5, 3)}