Mathematics I, test 1a
WS 2014/2015

1) Find all real solutions of the equation
$$3^{1+x} + 3^{1-x} = 10.$$

2) Find all real solutions of the equation
$$\big||x+3| - 2\big| \geq 1.$$

3) Sketch the graph of the function
$$f(x) = |2\cos x - 1| + 1.$$

Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 1b
WS 2014/2015

1) Find all real solutions of the equation
$$2\log_2^2 x = \log_2 8 - \log_2 x^5.$$

2) Find all real solutions of the equation
$$|x+2| - |2x-2| \geq -8.$$

3) Sketch the graph of the function
$$f(x) = \tan|-\pi x|.$$

Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 2a
WS 2014/2015

1) Find all real x for which the following expression is defined:
$$\sqrt{\log(2 - x - x^2)}.$$

2) Find all real solutions of the equation
$$1 - |\sin x| = \cos^2 x.$$

3) Sketch the graph of the function
$$f(x) = |\log(2x) - 1|.$$

Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 2b
WS 2014/2015

1) Find all real x for which the following expression is defined:
$$\log\sqrt{3 + x - x^2}.$$

2) Find all real solutions of the equation
$$\sin^2 x = \cos^2 x + \frac{1}{2}.$$

3) Sketch the graph of the function
$$f(x) = \left|\frac{x-1}{2x+1}\right|.$$

Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 3a
WS 2014/2015

1) Find all real x for which the following expression is defined:
$$\sqrt{\frac{x+2}{5 + x - 2x^2}}.$$

2) Find all real solutions of the inequality
$$|2x+1| - |2-x| > 4.$$

3) Sketch the graph of the function
$$f(x) = \left| \frac{x/2 + 2}{x - 1} \right|.$$
Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 3b
WS 2014/2015

1) Find all real x for which the following expression is defined:
$$\log \frac{x^2 + x - 8}{x - 1}.$$

2) Find all real solutions of the inequality
$$\big| |2x - 1| - 3 \big| \le 2.$$

3) Sketch the graph of the function
$$f(x) = \big| \log |x - 1| - 2 \big|.$$
Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 4a
WS 2014/2015

1) Find all real solutions of the inequality
$$\sqrt{x^2 + x - 6} \ge \sqrt{x^2 + 2x - 8}.$$

2) Find all real x for which the following expression is defined:
$$\sqrt{\log\big(2 - |5 - |2 - x||\big)}.$$

3) Sketch the graph of the function
$$f(x) = \big| e - e^{|1 - x|} \big|.$$
Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 4b
WS 2014/2015

1) Find all real x for which the following expression is defined:
$$\sqrt{\log\big(|3x - 1| - |3 - 2x|\big)}.$$

2) Find all real solutions of the inequality
$$\log(x^2 + x - 2) \ge \log(x^2 - 2x - 3).$$

3) Sketch the graph of the function
$$f(x) = \left| \frac{2 - x/3}{3 - 2x} \right|.$$
Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, test 5
WS 2014/2015

1) Find all real x for which the following expression is defined:
$$\sqrt{\log_2(1 + \sin x) + 1}.$$

2) Find all real solutions of the inequality
$$\big| 2 - |1 - 4x| \big| > 1.$$

3) Sketch the graph of the function
$$f(x) = \big| \log |x - 2| - 1 \big|.$$
Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.

Mathematics I, example test
WS 2014/2015

1) Find all real solutions of the equation
$$2\cos^2 x = 2\sin^2 x - 1.$$

2) Find all real solutions of the equation
$$\frac{x+1}{x+2} < \frac{x-2}{x-3}.$$

3) Sketch a graph of the function
$$f(x) = \left|\frac{2x+1}{x-2}\right|.$$

Indicate important values, e.g. intersections with axes, horizontal or vertical asymptotes, etc.