

- **Make sure you attend the exercise class that you have been assigned to!**
 - The instructor will present the starred problems in class.
 - You should then work on the other problems on your own.
 - The instructor and helper will be available for questions.
 - Solutions will be available online after the exercise class took place.
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(*)1. Determine the set of all real numbers $x \in \mathbb{R}$ that satisfy

$$x^2 - 3x - 4 < 0$$

- (a) by solving the inequality, and
(b) by plotting the graph of $y = x^2 - 3x - 4$.

2. Determine the set of all real numbers $x \in \mathbb{R}$ that satisfy

$$|2x - 1| + |4x + 1| < 3$$

- (*) (a) by solving the inequality (instructor will give you some hints), and
(b) by plotting the graph of $y = |2x - 1| + |4x + 1|$.

3. Determine the set of all real numbers $x \in \mathbb{R}$ that satisfy

$$\sqrt{1 - x^2} \leq -x$$

- (a) by solving the inequality, and
(b) by plotting the graphs of $y = -x$ and $y = \sqrt{1 - x^2}$.

Extra: Prove that for all positive real numbers $x, y \in \mathbb{R}^+$

$$\frac{2}{\frac{1}{x} + \frac{1}{y}} \leq \sqrt{xy}$$

- (a) by direct proof, and
(b) by using the arithmetic-geometric inequality.