## Assignment # 4. Due Oct. 9, 13:00

**Problem 1.** Solve and write the answer in the interval notation. **a.** |3 + 2x| < 5; **b.**  $|3 - 2x| \le 5$ .

**Problem 2.** Is it true that **a.**  $x \le 2$  implies  $|x| \le 2$ ? **b.**  $|x| \le 4$  implies  $x \le 4$ ? **c.**  $|x| \le 9$  implies  $x \ge -5$ ? **d.** x > 1 implies |x| > 1? **e.** |x| > 3 implies x > 3? (Please note that (P(x) implies Q(x)) means  $(\forall x \in \mathbb{R} (P(x) \implies Q(x)))$ .)

**Problem 3.** Is it true that for every real numbers x, y, z one has  $|x - z| \le |x - y| + |y - z|$ ?

**Problem 4.** For a set S given below describe the set of all upper bounds of S and the set of all lower bounds of S. If possible, write the answer in the interval notation.

<b>a.</b> $S = \{-1, 2, 5\};$	<b>b.</b> $S = [1, 2];$	c. $S = (2, 3];$
<b>d.</b> $S = [0, 4);$	<b>e.</b> $S = (-\infty, 3];$	<b>f.</b> $S = (1, \infty)$
<b>g.</b> $S = \mathbb{R};$	<b>h.</b> $S = \emptyset$ .	