

## I Exercise Lesson

Monday, September 29th 2014

**Ex. 1** For each of the following subsets of  $\mathbb{R}$  find accumulation points, interior and exterior points, isolated points.

$$A = (0, 1)$$

$$B = \{x \in \mathbb{R} \mid |x| \geq 3\}$$

$$C = \{1, 2\}$$

Moreover determine:  $A^c$ ,  $A \cup B$ ,  $A \cup C$ ,  $B^c$ ,  $B^c \cap C$ .

**Ex. 2** For each of the following subsets of  $\mathbb{R}$  find accumulation points, interior and exterior points, isolated points.

$$X = (-1, 1/2] \cup [1, 2)$$

$$Y = [3/4, 2]$$

Determine also  $X^c$ ,  $X \cup Y$ ,  $X \cap Y$ .

**Ex. 3** Solve the given equations.

- $2x - 3 = 0$
- $x^2 - 1 = 0$
- $x^2 - x = 0$
- $x^2 - 2x + 1 = 0$
- $x^2 - 4x - 5 = 0$
- $9x^2 - 6x + 1 = 0$
- $x^3 - 1 = 0$
- $x^2 - 5x + 6 = 0$
- $x^3 - 2x^2 - 9x + 18 = 0$
- $\frac{x^5 - x^4}{x + 2} = 0$
- $\frac{x^2 - 2x + 1}{2x - 2} = 0$
- $\frac{x^2 + 3x - 4}{x - 5} = 0$

**Ex. 4** Solve the given inequalities and write the solutions in form of (union of) intervals.

- $x^2 + 1 \geq 0$
- $3x^2 - 1 < 0$
- $x^2 + x - 6 \geq 0$
- $x^3 - x \geq 0$
- $\frac{2x-3}{x+1} > 0$
- $\frac{x-1}{x} < 0$
- $\frac{x^2-1}{x+3} \geq 0$
- $\frac{x^3+2x^2-3x}{x^2+x+1} \leq 0$