1 Mid Term Exam Summer Semester (1437/1438)
280-Math

Question 1(4+4+2). Determine the sup, max, inf and min of the following sets:

$$A = \{x \in R, x^2 - 6x + 8 \geq 0\}$$

$$B = \left\{1 - \frac{(-1)^n}{n}, n \in N\right\} \quad ; \quad C = \{x \in Q, 0 \leq x \leq \sqrt{2}\}$$

Question2 (6). Show that the sequence $x_n = \frac{2^n}{n!}$ is convergent and fid its limit.

Question3 (6). Decide whether the following sequences are Cauchy:

$$a_n = \frac{\sin\frac{n}{2}\tan\frac{2}{n}}{2n + 1} \quad ; \quad b_n = (-1)^n\, n$$

Question3 (3). Decide whether the following sequence is bounded:

$$x_n = \frac{2n}{n + 1} - \frac{n + 1}{2n}$$