Real Numbers

28. For the set A in the set of real numbers, determine the supremum, infimum, minimum, and maximum, if they exist:
$$A = \left\{ 1 - \frac{1}{n} \mid n \in \mathbb{N} \right\}.$$

Also, provide examples of a lower bound and an upper bound. Provide a detailed explanation of why the specified value is the infimum or supremum, or explain why the set does not have an infimum or supremum.

29. For the set S in the set of real numbers, determine the supremum, infimum, minimum, and maximum, if they exist:
$$S = \{ x \in \mathbb{R} : |x| + 2 \geq 2x \}.$$

Also, provide examples of a lower bound and an upper bound. Provide a detailed explanation of why the specified value is the infimum or supremum, or explain why the set does not have an infimum or supremum.

30. For the sets A and B in the set of real numbers, determine the supremum, infimum, minimum, and maximum, if they exist:

(a) $A = \{ x \mid x^2 \leq 11 \}$.

(b) $B = \{ x \in [2, 5] \mid x \text{ contains at least two threes in its decimal representation} \}$.

Also, provide examples of a lower bound and an upper bound for A and B. For part (b), give the definition of infimum and supremum and provide a detailed explanation of why the specified value is the infimum or supremum, or explain why the set does not have an infimum or supremum.

Number Systems

31.   (a) Convert the decimal number 751 into a base-6 number.

(b) Convert the base-6 number 451 into a decimal number.

32.   (a) Convert the decimal number 588 into a base-6 number.

(b) Convert the base-6 number 544 into a decimal number.