This assignment is an optional reminder of math background that will be needed for this course.

1. **Sets**: Decide whether each of the following statements about sets are true or false.
   (a) \( \{1, 2, 3\} = \{3, 2, 1\} \)
   (b) \( \{1, 2, 3\} \cup \{2, 3\} = \{1, 2, 3\} \)
   (c) \( \{1, 2, 3, 4\} \cap \{2, 3\} = \{1, 3\} \cup \{2, 4\} \)
   (d) \( \{x \mid x \text{ is an integer and } 0 < x < 4\} = \{1, 2, \ldots, 10\} \cap \{4, 5, \ldots, 10\} \)
   (e) \( \{1, 2, 3\} \cap \{4, 5, 6\} = \{0\} \)

2. **Summations**: Evaluate each of the following expressions.
   (a) \( \sum_{i=1}^{100} 5 \)
   (b) \( \sum_{i=1}^{100} i \)
   (c) \( \sum_{i=1}^{100} 3i \)
   (d) \( \sum_{i=1}^{60} \sum_{j=1}^{63} 1 \)
   (e) \( \sum_{i=1}^{100} 1 + 2 + 3 \)
   (f) \( \sum_{i=1}^{100} (1 + 2 + 3) \)

3. **Floors and ceilings**: Evaluate each of the following expressions.
   (a) \([3.4]\)
   (b) \([3.4]\)
   (c) \([-6.5]\)
   (d) \([-6.5]\)
   (e) \([8]\)
   (f) \([0]\)

4. **Logarithms**: Rewrite each of the following expressions in a form that does not contain the log function.
   (a) \( \log_2 8 \)
   (b) \( \log_2 1 \)
   (c) \( \log_2 (2^x 8^y 4^z) \)

5. **Limits**: Use L'Hôpital's rule to evaluate the following limits.
(a) \[\lim_{n \to \infty} \frac{10n^2 + n + 5}{2n^2 + 4n + 5000}\]

(b) \[\lim_{n \to \infty} \frac{\sqrt[3]{n}}{\log_3 n}\]

6. **Inequalities:** Decide whether each of the following statements are true or false.

(a) For any \(n > 0\), the inequality \(100n + 5 < 100n + n\) holds.
(b) For any \(n > 5\), the inequality \(100n + 5 < 100n + n\) holds.
(c) For any \(n > 0\), the inequality \(3n^2 + 5n > 3n^2\) holds.
(d) For any \(n > 5\), the inequality \(3n^2 + 5n > 3n^2\) holds.