✓ 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) \( \lfloor 3.4 \rfloor \)
   
   (b) \( \lceil 3.4 \rceil \)
   
   (c) \( \lfloor -6.5 \rfloor \)
   
   (d) \( \lceil -6.5 \rceil \)
   
   (e) \( \lfloor 8 \rfloor \)
   
   (f) \( \lceil 0 \rceil \)

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) $\lim_{n \to \infty} \frac{10n^2 + n + 5}{20n^2 + 40n + 5000}$
(b) $\lim_{n \to \infty} \frac{\frac{3}{\sqrt{n}}}{\log_3 n}$

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.