Discussion Questions for "Number Representation"

1. Consider an alternative integer representation in *N* bits which uses the high order (leftmost) bit as the sign bit, and the remaining *N*-1 bits as an unsigned value. Can you think of reasons why two's complement numbers are a better integer representation than this alternative?

2. Consider the following properties relating to the mathematical concept of integers:

    a. Commutativity: a+b == b+a
    b. Associativity: (a+b)+c == a+(b+c)
    c. Distributivity: a*(b+c) == (a*b) + (a*c)
    d. Infinite: For every x there is an x+1 and x < x+1

    Do all three laws hold for the Java "int" data type? Do they hold for "double"? If not, give counterexamples.

3. Can you create a Venn diagram that demonstrates the relationships between the Java primitive numeric types: byte, short, int, long, float, and double? Can you describe the values in each section of your diagram?

4. Describe an application where it would be useful to use constants instead of literal values. How would the use of constants improve the application?