MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 1.1 **Math 1090** FALL 2009

SOLUTIONS

1. (a) Observing that $\sqrt{4} = 2$, the only natural number in the set is $\sqrt{4}$.

   (b) The integers in the set are $0, \sqrt{4}, -5, -102$.

   (c) The rational numbers in the set are $0, \sqrt{4}, -5, -102, \frac{8}{3}, 7.45, -\frac{1}{4}$.

   (d) The irrational numbers in the set are $\frac{\pi}{2}, \sqrt{3}$.

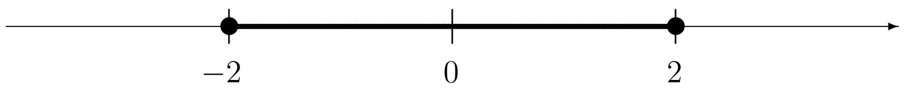
2. (a) The inequality in set B is strict, which is not the case in set A. This means that $2 \in A$ but $2 \notin B$. Otherwise, the two sets are identical.

   (b) Set A consists of *all* real numbers less than or equal to 2. Set C consists only of the integers less than or equal to 2, which means that we can write

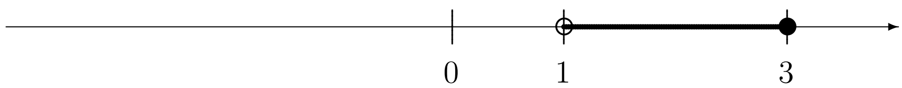
   $$C = \{2, 1, 0, -1, -2, -3, \ldots\}.$$

   As a result, there are many rational and irrational numbers which are members of A but not members of C. For instance, $\frac{1}{2} \in A$ but $\frac{1}{2} \notin C$.

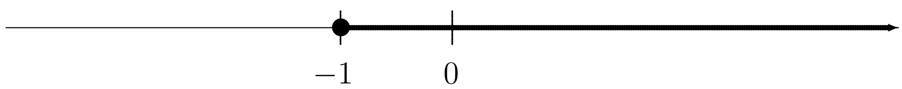
3. (a) This is equivalent to the interval $[-2, 2]$. It can be represented by



   (b) This is equivalent to the interval $(1, 3]$. It can be represented by



   (c) This is equivalent to the interval $[-1, \infty)$. It can be represented by



(d) This is equivalent to the interval $(-\infty, 0] \cup \left(\frac{2}{3}, 3\right)$. It can be represented by