Explorations and Activities Exercise

Before stating this homework, review the Symbolically Write Guidelines, which is also posted on the course homework page. It will answer many of the questions you might otherwise have.

Hint. The pharse *provided that* is used in definitions and can be thought of as saying *if and only if*.

Hint. For parts 1 and 2, when asked to symbolically complete a sentence started in English, your answer should be of the form $(\forall x \in U)[P(x)]$ or $(\exists x \in U)[P(x)]$ for some properly choosen universe U (e.g., $\mathbb{R}$, A) and some open sentence $P(x)$, which should contain the variable x and might contain the: number b, set A.

▷.   Definition 14 will be presented and explored (much more in depth) in Math 554 (*Analysis*) and was used (perhaps unknowinging) in calculating limits in Calculus.

Def.   **Definition 14**. Let A be a subset of the real numbers. The number $b \in \mathbb{R}$ is called an <u>upper bound</u> for the set A provided that for each element $x \in A$, we have $x \le b$.

►.   Using Definition 14, complete the parts of this exercise.

1.   Symbolically complete the following sentence (which is started in English). | Box your answer. |

Let $A \subseteq \mathbb{R}$. The number b is called an <u>upper bound</u> for the set A provided that ...

2.   Symbolically complete the following sentence (which is started in English). | Box your answer. |

Let $A \subseteq \mathbb{R}$. The number b is <u>not</u> an upper bound for the set A provided that ...

3.   Without using the quantifier symbols, complete the following sentence in English. | Box your answer. |
You can use math symbols similar to those in Definition 14.

Let $A \subseteq \mathbb{R}$. The number b is <u>not</u> an upper bound for the set A provided that ...

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