The following questions have very simple, “obvious” answers. They are intended to encourage you to THINK about some very simple aspects of functions and function notation.

1. A recent Lesson (HW 25), in a problem taken partly from the textbook, was about

\[ f(x) = \frac{1}{x^2} \]

**DOMAIN:**

(a) **What kind of thing is \( x \) supposed to represent here? What kind of mathematical object?**

Give a simple, straightforward answer that can be understood by anyone familiar with elementary algebra. [Your answer should look like: “\( x \) represents …”; keep the answer simple.]

(b) Suppose we want to use the formula above (for \( f(x) \)) to define a function \( f \) from some appropriate domain (as described in Lesson HW 25) to some given codomain, as was the case in Lesson HW 25. The domain of this function will be a set, as is every domain of a function. Assuming you answered (a) correctly (if you didn’t, you probably won’t get this question right), **what kind of things will be elements of this domain?** Give a simple, straightforward answer about what those things are, an answer that can be understood by anyone familiar with elementary algebra, even if they don’t know what a function is or what the domain of a function is.

(c) As mentioned, the domain of a function is a set. Based on your answer to (b), **what kind of set is the domain in this case?** A set of horses? A set of … what? -- based on your answer to (b). (You are not asked for a specific description of the domain; answer in a way which does not depend on the particular formula for \( f(x) \), but depends only on your answers to (a) and (b).

So, what do we choose for domain?

**CODOMAIN:**

(d) **What kind of thing is \( f(x) \)? For each \( x \), what kind of mathematical object?**

(We have talked about this often in class; however, if you answered (a) incorrectly, you might get this wrong also.) Give a simple, straightforward answer that does not depend on the particular formula for \( f(x) \).

So, what do we choose for codomain?
Now think about HW 29 on the UB function.

The following questions have simple answers. They are intended to encourage you to THINK about some very basic aspects of functions and function notation.

Refer to textbook, class notes, and homework for definition of $UB(S)$.

2. We have used the notation $UB(S)$, a notation defined in class and textbook and homework: For every set $S$ of real number, $UB(S)$ is the set of upper bounds of $S$.

**DOMAIN:**

(a) **What kind of thing is $S$ supposed to represent here?** What kind of mathematical object?

(b) Suppose we want to use the definition above (for $UB(S)$) to define a function $UB$ from some appropriate domain (as described in Lesson HW 29) to some appropriate codomain (as described in Lesson HW 29). The domain of this function will be a set, as is every domain of a function. Assuming you answered (a) correctly (if you didn’t, you probably won’t get this question right), **what kind of things will be elements of this domain?** Give a simple, straightforward answer about what those things are, an answer that can be understood even if someone doesn’t know what a function is or what the domain of a function is.

(c) As mentioned, the domain of a function is a set. Based on your answer to (b), **what kind of set is the domain in this case?** A set of horses? A set of ... what, based on your answer to (b)? Just give a simple answer, based on your answers to (a) and (b).

So, what do we choose for domain?

**CODOMAIN:**

(d) **What kind of thing is $UB(S)$?** For each $S$, what kind of mathematical object is $UB(S)$? (We have talked about this often in class; however, if you answered (a) incorrectly, you might get this wrong also.) Give a simple, straightforward answer that depends only on what the “outputs” of $UB(S)$ are, without trying to analyze in detail what they “look like”.

So, what do we choose for codomain?