Homework true false questions. In the midterm guessing will be both encouraged and discouraged— you will get $2x$ points for a correct answer and $-x$ points for a wrong one where $x$ is yet to be determined.

1) A bounded complete separable metric space is sequentially compact.
2) The Cantor set is uncountable and non-separable.
3) Any path-connected metric space is connected.
4) The continuous image of an open set is open.
5) If $A$ is a closed subset of the metric space $(X, d)$ and $B$ is a closed subset of $A$ (with the inherited metric) then $B$ is closed in $X$.
6) The complement of a complete subset of a metric space is open.
7) A sequence $(x_n)$ in a metric space $(X, d)$ is Cauchy iff for every open set $U \subseteq X$ there is an $N \in \mathbb{N}$ such that $n, m \geq N \Rightarrow \{x_n, x_m\} \subseteq U$.
8) The set of all finite subsets of $\mathbb{R}$ is countable.
9) Any two metric spaces that are homeomorphic are isometric.
10) If $U_n$ are open non-empty subsets of $\mathbb{R}^n$ and $U_{n+1} \subseteq U_n$ then $\bigcap_{n=1}^{\infty} U_n$ is non-empty.
11) No countable metric space is complete.
12) No countable metric space with more than 2 points is connected.
13) If $(s_n)$ is a sequence in $\mathbb{R}$ which is bounded above then $\lim \inf s_n = \lim \sup s_n$.
14) If $\lim \sup |s_n| = \lim \sup |t_n|$ then $\lim \sup (s_n + t_n) = 2 \lim \sup s_n$.
15) Any open subset of $\mathbb{R}^2$ is a union of open balls.