True or False?
(test 7, 8/01/2014)

Naam:________________________________
Studentnr.:_____________________________

True | **False**

☐ 1. A continuous bijection from a Hausdorff space to a compact space is a homeomorphism. ☐

☐ 2. The cone of S^1 can be embedded in $\mathbb{R}^2$. ☐

☐ 3. If X is compact and connected and $f : X \to \mathbb{R}$ is continuous, then the image of f is of type $[m, M]$ with $m, M \in \mathbb{R}$. ☐

☐ 4. Any topological manifold is automatically normal as a topological space. ☐

☐ 5. For any $A \subset S^2$ nonempty, $S^2 \setminus A$ can be embedded in $\mathbb{R}^2$. ☐

☐ 6. $\mathbb{R}$ endowed with the lower limit topoology is 2-nd countable. ☐

☐ 7. The boundary of any compact subspace $X \subset \mathbb{R}^n$ is compact. ☐

☐ 8. $\mathbb{R}$ endowed with the lower limit topology is connected. ☐

☐ 9. There exists $A \subset \mathbb{R}^2$ whose boundary is the entire $\mathbb{R}^2$. ☐

☐ 10. In $\mathbb{R}$ endowed with the lower limit topology, there does not exist a largest open contained in $(0, 1)$. ☐

☐ 11. For any topology basis $\mathcal{B}$ on a set X, there exists a topology $\mathcal{T}$ on X such that $\mathcal{B}$ is a basis for the topological space $(X, \mathcal{T})$. ☐

☐ 12. The quotient of any compact Hausdorff space is compact and Hausdorff. ☐

☐ 13. Any path connected space is connected. ☐

☐ 14. A subset of a space X is closed if and only if it concides with its closure. ☐

☐ 15. Assume that X is a normal space, A and B are compact spaces, $f : A \to X$, $g : B \to X$ are continuous and $f(a) \neq g(b)$ for all $a \in A, b \in B$. Then one can find $\phi : X \to \mathbb{R}$ continuous such that $\phi \circ f = 0, \phi \circ g = 1$. ☐

☐ 16. Any connected space is path-connected. ☐

☐ 17. Any compact metrizable space is sequentially compact. ☐

☐ 18. Any 2-nd countable space is also 1-st countable. ☐

☐ 19. There is an action of a group Γ on $\mathbb{R}^2$ such that $\mathbb{R}^2/\Gamma$ is homeomorphic to the Klein bottle. ☐

☐ 20. If X is compact (but not necessarily Hausdorff) then any closed subspace A of X is compact. ☐

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