Problem sheet # 12

54	55	56	57	58	59	60	61	62	63	Σ
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(54) [1 point]
Let $\varphi: D \to X$ be a reg. param. of a hyper surface $X \subset \mathbb{R}^n$. Please give for an arbitrary point $x \in X$ a non-zero normal vector onto X in terms of φ and related objects. □

(55) [1 point]
Please give the definition of the metric $d: X \times X \to \mathbb{R}$ (distance function) for a Riem. mfd.
Hint: You do NOT have to show that it is actually a metric. □

(56) [1 point]
Please state the Hopf-Rinow theorem! □

(57) [1 point]
Let V be a vec. sp.. Please define the canonical isomorphism from V into its bidual space V^{**}! □

(58) [2 points]
Let $f: (D, g) \to (D', h)$ be an isometry between Riem. domains. How are g and h related?

(59) [1 point]
Please give the definition for an open subset $U \subset (X, g)$ to be geodesically convex. □

(60) [1 point]
Let a be a point in a Riem. mfd (X, g). Please define the exponential map $\exp: T_a X \to X$.

(61) [1 point]
Let a be a point in a Riem. mfd (X, g) and V a 2-dim subspace of $T_a X$. Please define the sectional curvature $K_{a,V}$!