
Homework 7
Due: Friday, October 7

1. [F]2.2.1

2. Let $f : \mathbb{R}^n \rightarrow \mathbb{R}$ be a function which is differentiable at $\vec{a} \in \mathbb{R}^n$. Suppose $\vec{u} \in \mathbb{R}^n$. Show that the directional derivative $\partial_{\vec{u}} f$ vanishes at \vec{a} , i.e., that

$$\partial_{\vec{u}} f(\vec{a}) = 0,$$

if and only if \vec{u} is perpendicular to the gradient vector $\nabla f(\vec{a})$.

3. [F]2.4.1

4. [F]2.4.2 (The book writes $\partial_1 f(\mathbf{x})$ where we've been writing $\partial_{x_1} f(\vec{x})$ in class.)

5. [F]2.6.1