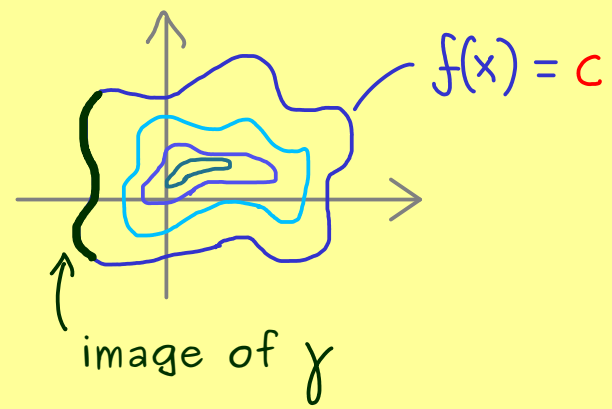


Multivariable Calculus - Part 9

Gradient: $f: \mathbb{R}^2 \rightarrow \mathbb{R}$

$$\gamma: \mathbb{R} \rightarrow \mathbb{R}^2$$

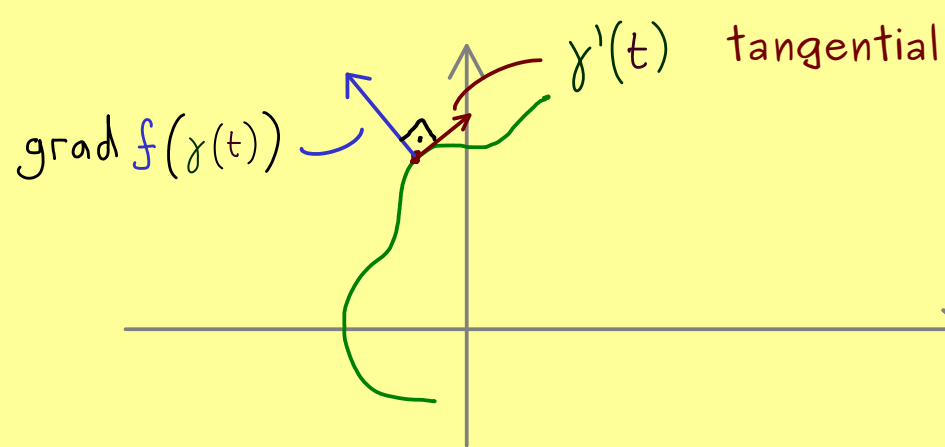


Then: $(f \circ \gamma)(t) = c$ for all $t \in \mathbb{R}$

$$\Rightarrow \frac{d}{dt}(f \circ \gamma)(t) = 0$$

chain rule

$$\Rightarrow J_f(\gamma(t)) J_\gamma(t) = \langle \text{grad } f(\gamma(t)), \gamma'(t) \rangle = 0$$



Gradient is perpendicular to the contour line.