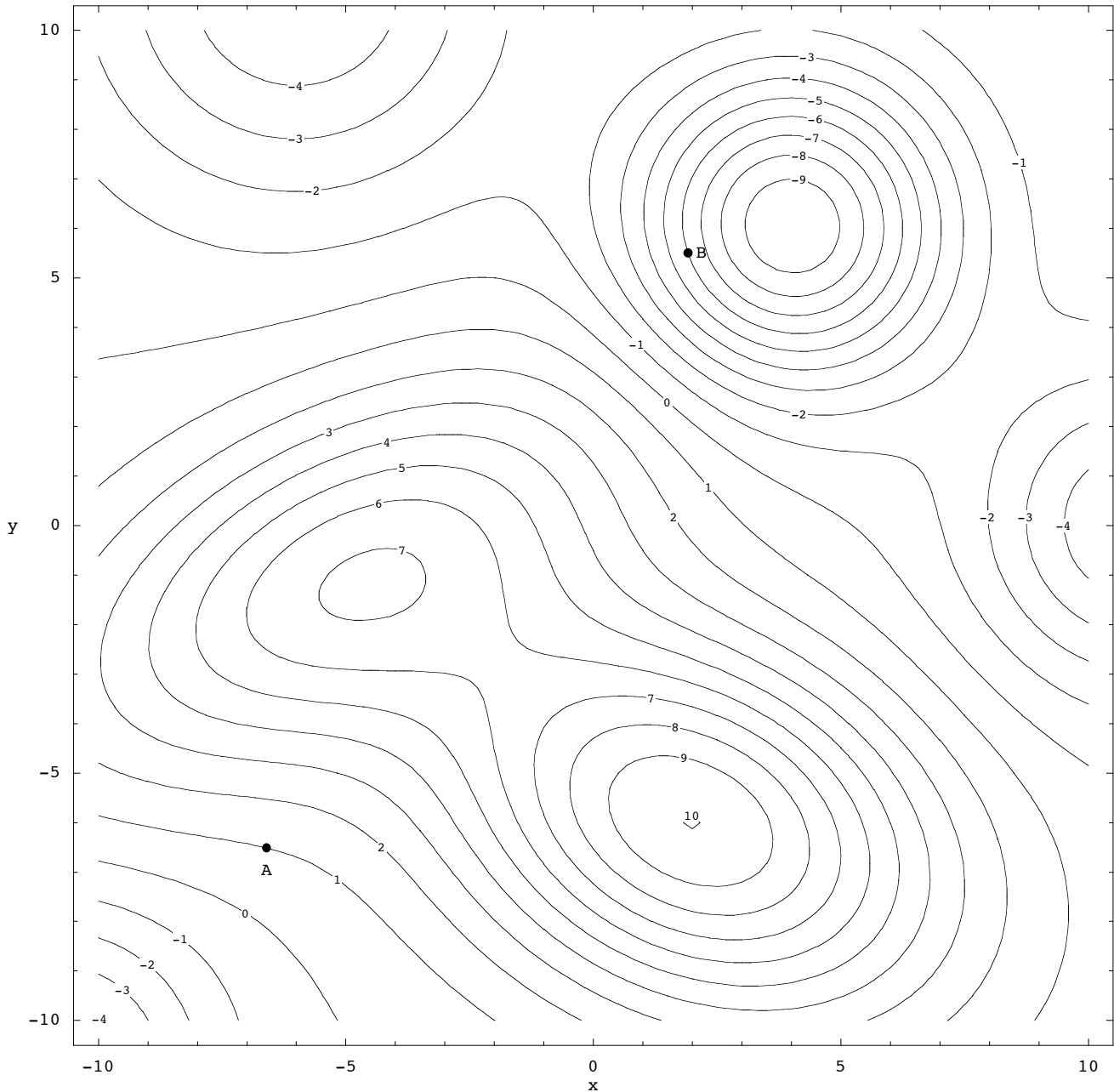


Greatest rate of change



The plot above shows level curves for a function $f: \mathbb{R}^2 \rightarrow \mathbb{R}$. It might be helpful to think of each output as the temperature (in degrees Celsius) at a point in the plane (with distances measured in meters).

1. For the point A, estimate the direction of the greatest rate of change in outputs $f(x,y)$ with respect to changes in inputs (x,y) .
2. For the point A, estimate the magnitude of this greatest rate of change.
3. At the point A, draw a vector in the direction of the greatest rate of change having magnitude equal to that rate of change. Note that you will need to choose a separate scale for rate of change. For example, with the temperature interpretation, rate of change has units of degrees Celsius per meter while the scales on the x and y axes are in meters.
4. For the point B, estimate the direction of the greatest rate of change in outputs $f(x,y)$ with respect to changes in inputs (x,y) .
5. For the point B, estimate the magnitude of this greatest rate of change.
6. At the point A, draw a vector in the direction of the greatest rate of change having magnitude equal to that rate of change. Use the scale you chose in #3.