

Problem statement Suppose $y = f(x)$ is a function with domain all real numbers. Show that the following is *impossible*:

The curvature $\kappa(x)$ at every point of the graph of $y = f(x)$ is at least 1:
 $\kappa(x) \geq 1$ for all x .

Comment/hint Try to understand this statement geometrically (remember, $f(x) = x^2$ flattens out towards the edges as $x \rightarrow \pm\infty$ so it doesn't violate the impossibility assertion!), but verify it using calculus. One way is to integrate an inequality.