

## WHERE DOES A DERIVATIVE NOT EXIST (§3.2)

4 REASONS:

#1: "If a function is differentiable, then it is continuous" also means that "If a function is NOT continuous, then the function is NOT differentiable".

Thus, a derivative does not exist anywhere a function is not continuous.

#2: A derivative does not exist at a point if the derivative from the left is different from the one on the right ... (corner)

#3: A derivative does not exist at a point if the slopes of the secant lines approach  $\infty$  from one direction and  $-\infty$  from the other ... (cusp)

#4: A derivative does not exist at a point if the slopes of the secant lines approach  $\infty$  or  $-\infty$  from both sides ... (vertical tangent line)