DATE: _____

3.2 Differentiability

Stating a function is differentiable at a point means:

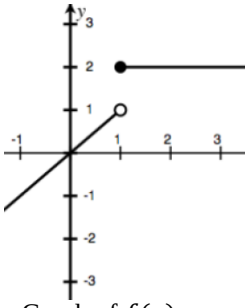
- able to differentiate
- able to get the derivative
- can find the slope of the tangent line
- can find the slope of the curve at a given point

When is a function NOT differentiable?

A function is NOT differentiable at $x = c$, when

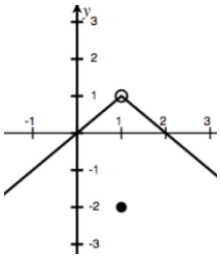
① the function is NOT continuous @ $x = c$.
(jumps, holes, or vertical asymptotes)

"Jump"



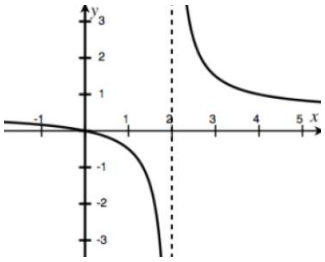
Graph of $f(x)$

"Hole"

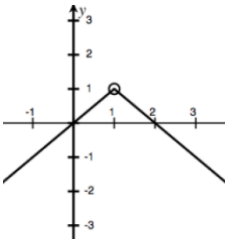


Graph of $g(x)$

"Vertical Asymptote"



Graph of $f(x)$



Graph of $h(x)$

② the function's derivative from the left of c is not equal to the function's derivative from the right of c. (sharp turn)

$g(x) = |2x + 2|$

③ the function's derivative is $\pm\infty$. (tangent line is vertical)

$h(x) = \sqrt[3]{x - 3} + 2$

$f(x) = \sqrt[3]{x} + 2$