What you'll Learn About
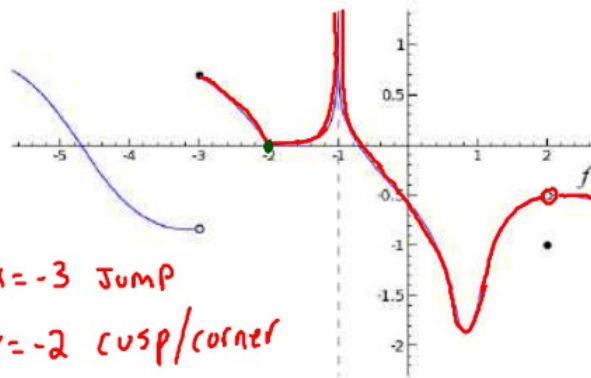
- How the derivative might fail to exist
- Differentiability implies local linearity
- Differentiability implies Continuity

$(-\infty, -3) \cup (-3, -2) \cup (-2, -1) \cup (-1, 2) \cup (2, \infty)$

Continuous → has a slope ↓
you can draw a tangent line

a. Find all points where the function, f(x), is differentiable.

$x = -2$ ←— b. Find all points where the function is continuous, but not differentiable.

$x = 2, x = -1, x = -3$ ←— c. Find all points where the graph is neither continuous nor differentiable.

$x = -3$ JUMP

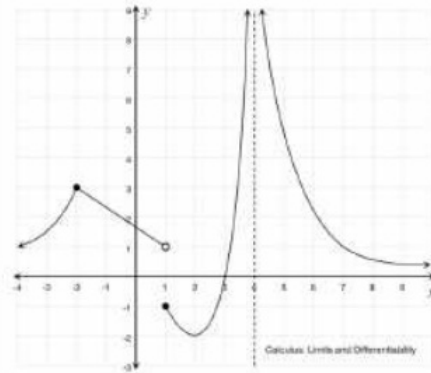$x = -2$ cusp/corner

$x = -1$ VA

$x = 2$ Hole
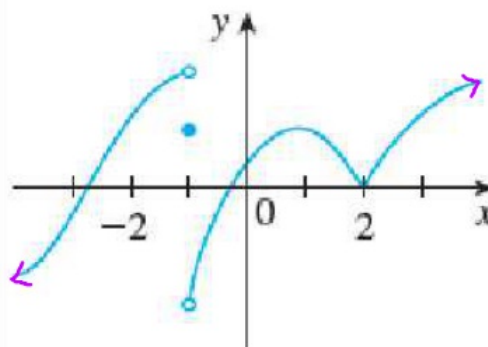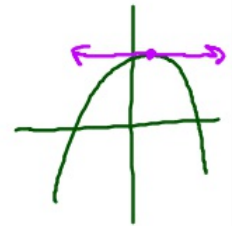
$X = -1$ not continuous
not differentiable

$X = 2$ continuous
not differentiable

3.2 Differentiability:

a. Find all points where the function, f(x), is differentiable.
b. Find all points where the function is continuous, but not differentiable.
c. Find all points where the graph is neither continuous nor differentiable.

$x = -2$ Continuous
            Not differentiable

$x = 1, 4$ Not Continuous
                Not Differentiable

$$\lim_{x \to 0} \frac{f(x) - f(a)}{x - a}$$

Vertical Tangent (No Slope)

$x = 0$ Continuous
       but not differentiable