

Discontinuity

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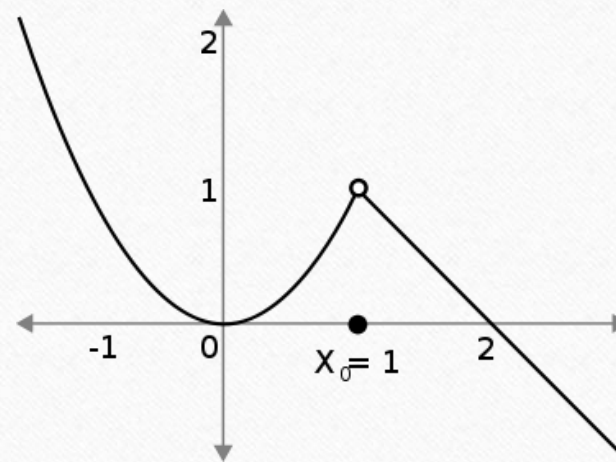
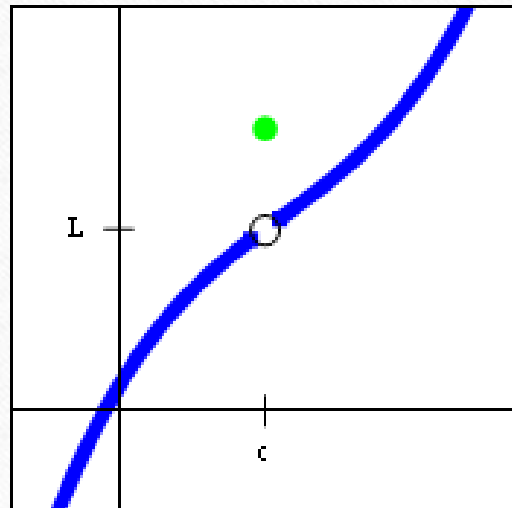
Abraham Orta

What is discontinuity?

- Discontinuity is the point at which mathematical is discontinuous and stops. When a function is not continuous at a point, then we can say it is discontinuous at that point.
- There are several types of discontinuities: Removable, Infinite, finite and oscillating.

Removable

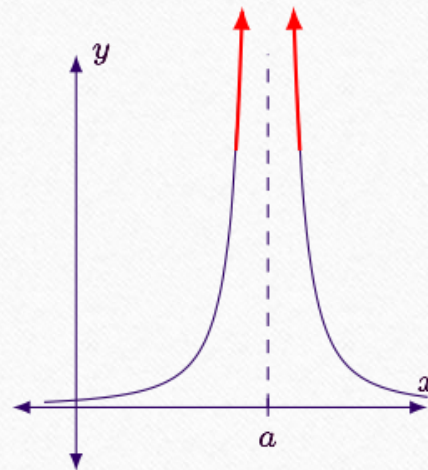
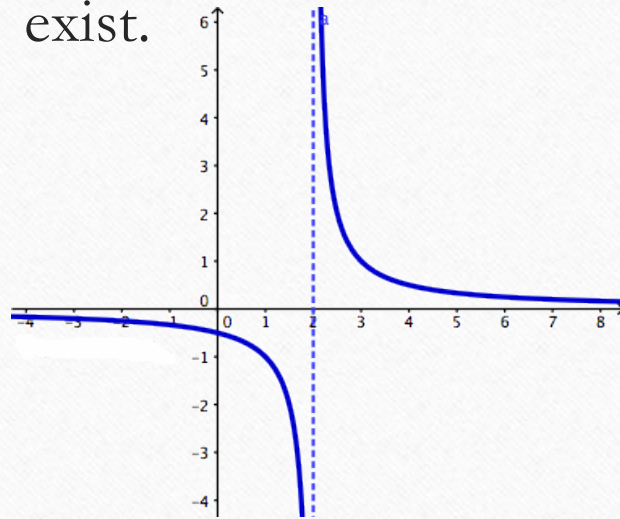
- A removable discontinuity exists when there is a limit in the function, but at least one of them do not meet. This forms the holes that can be seen in the graphs. This type is commonly used to find slopes in tangent lines.



In this examples, the one and only true value is the one marked as a colored dot, not the empty dot.

Infinite

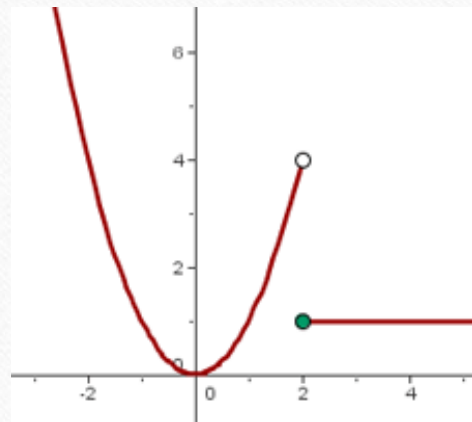
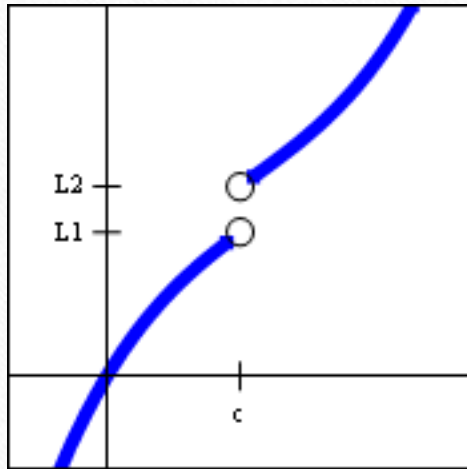
- When one of the one-sided limits of the function is infinite. When the limit from both sides is the same, then we can say that two-sided limit will also exist.



Example of an Infinite Discontinuity

The infinite discontinuities are present in the graphs that have vertical asymptotes, like the ones in this examples.

Finite



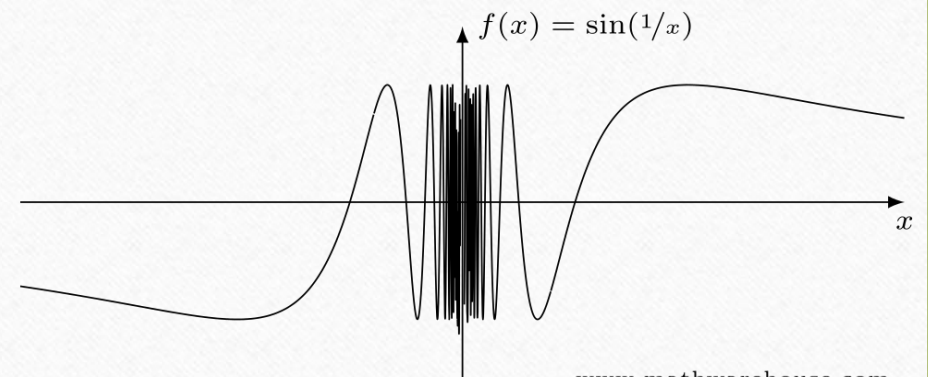
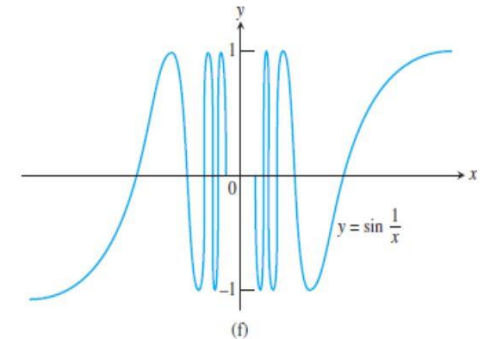
- This discontinuity exists when the two-sided limit is not present, yet both one-sided limits are finite but not equal to each other.
- This types of discontinuities are also called 'jump discontinuities' and are often found in piecewise functions with 3 or more graphs in it.

Oscillating

- Exist when the values of the function appear to be approaching two or more values simultaneously.
- It appears in both graphs that both lines are approaching the same value, but there is actually no limit.

Types of Discontinuity

- The function in (f) has an **oscillating discontinuity**: it oscillates and has no limit as $x \rightarrow 0$.



Reference

- (n.d.). Retrieved August 29, 2017, from <http://www.milefoot.com/math/calculus/limits/Continuity06.htm>