

What Kinds of Discontinuities Are There?

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A.P. Calculus AB/Calculus I
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Recall: Formal Definition of Continuity

Let f be a function and c a value of its domain. Then f is continuous at c if and only if:

$$\lim_{x \rightarrow c} f(x) = f(c).$$

Remember: continuity works both ways and is all or nothing!

Over the limit

Let's return to the function I asked you to think about at the start of class.

- What's its limit as $x \rightarrow 0$?
 - It has none!
- What “went wrong” with its limit?
- How can we deal with it?
 - What about handed limits?
- Is it continuous at $x = 0$?
- What “went wrong” with its continuity?

What to do about it

Let's revisit our driving question:

Are all discontinuous functions alike?

We've just looked at how one discontinuous function is, but are they all like that? Let's look at some functions and find out!

Activity Time

Questions before we begin?

- Get together with your home group.
 - Each group gets a worksheet and set of cards.
- Remember our formal definition of continuity, since it will help you to understand discontinuity:

Given a function f and a value c in its domain, f is continuous at c if and only if
$$\lim_{x \rightarrow c} f(x) = f(c).$$

- Be prepared to share results with the class.