Discontinuities in graphs

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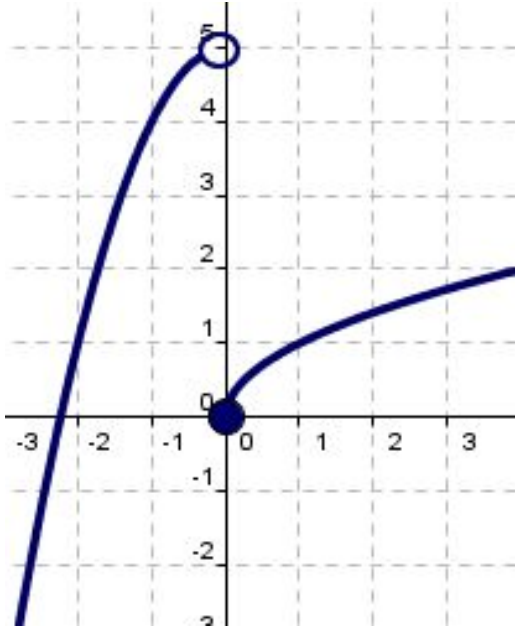
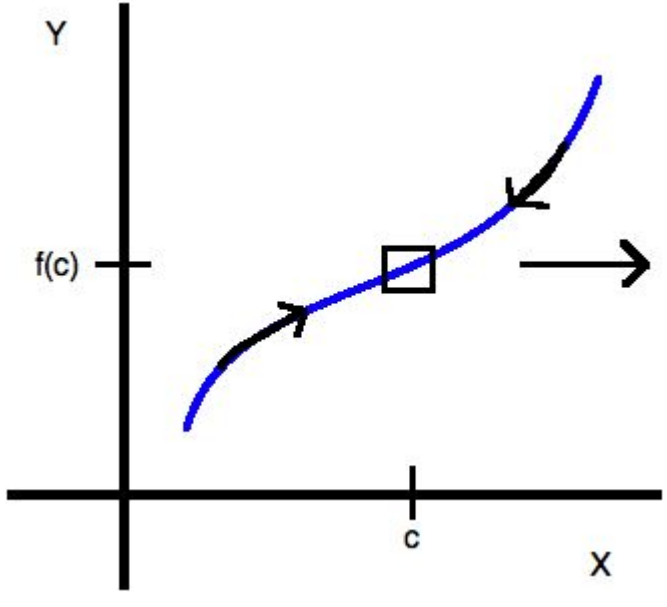
Discontinuity

Functions that aren't continuous at an “x” value.

there are four types of discontinuities.

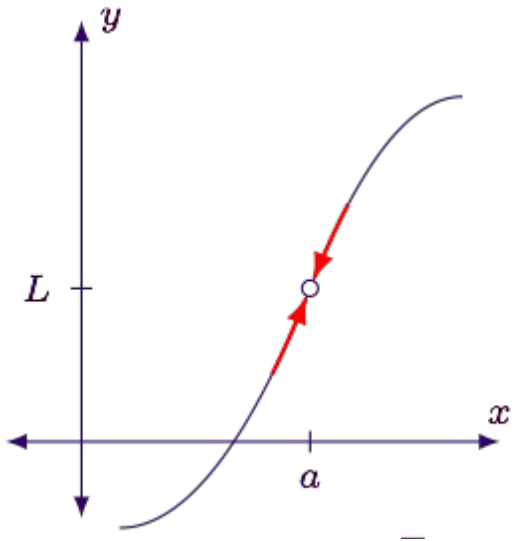




example of a continuous function

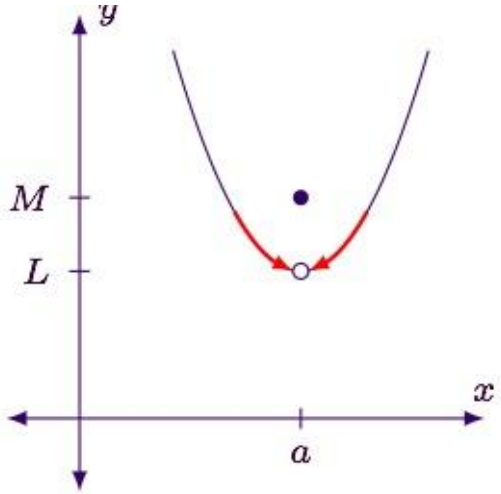
Removable discontinuity

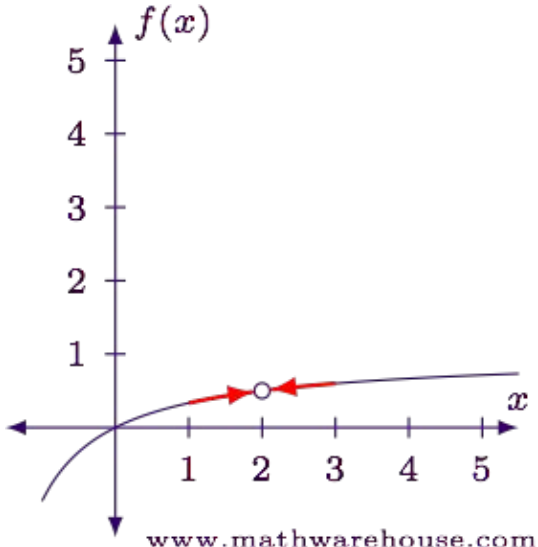
When there is a point on the graph that is undefined and it has to be fixed in order to be defined.



Example

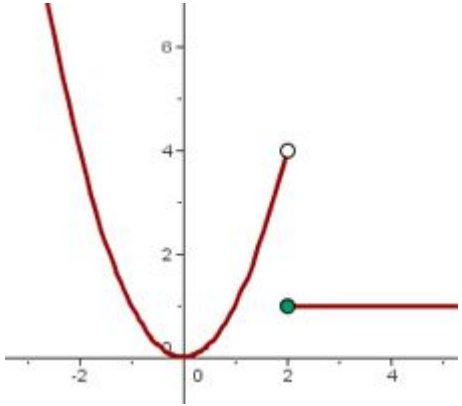
Graphs such as the one on the left has a limit, but as hole(removable discontinuity). The way to fix it and make it have a value is to look on the lim function the graph is giving and use the “x” value, the next step to fix it is to substitute the value of “x” on the lim function and then apply the result on the graph. Graph on the right show how it will look a graph when the hole is fix.





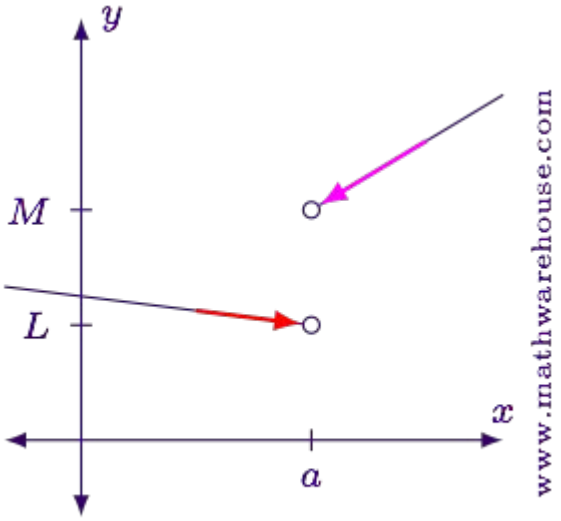
Jump discontinuity

Exists whenever the function jumps from one point to another in the graph

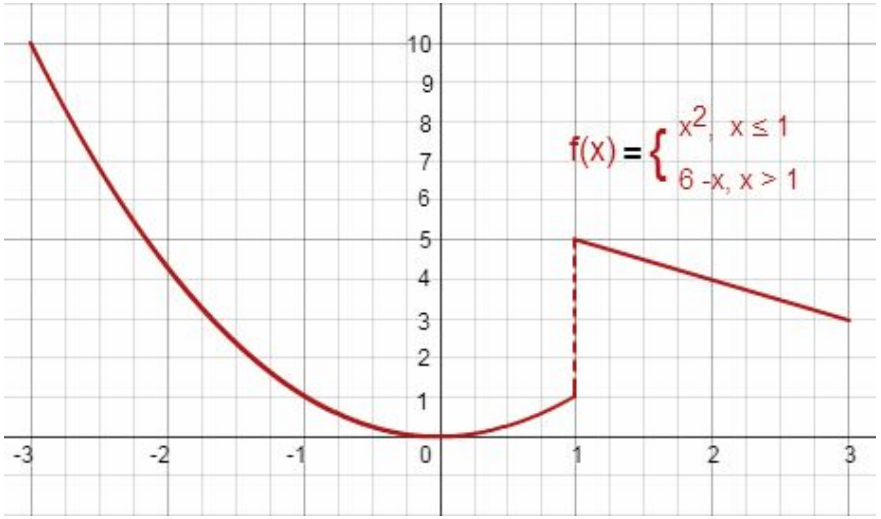


Example

Both graphs are one sided(same as normal limits just that the “x” is restricted on one side)and the “x” is approaching different values on different directions but on the same side.



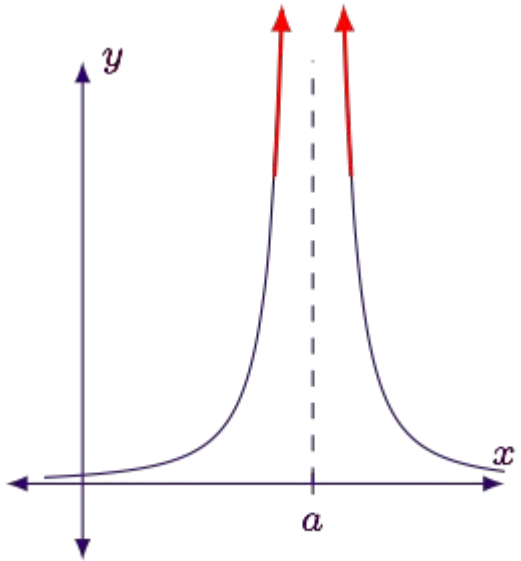
Example of a Jump Discontinuity



Infinite discontinuity

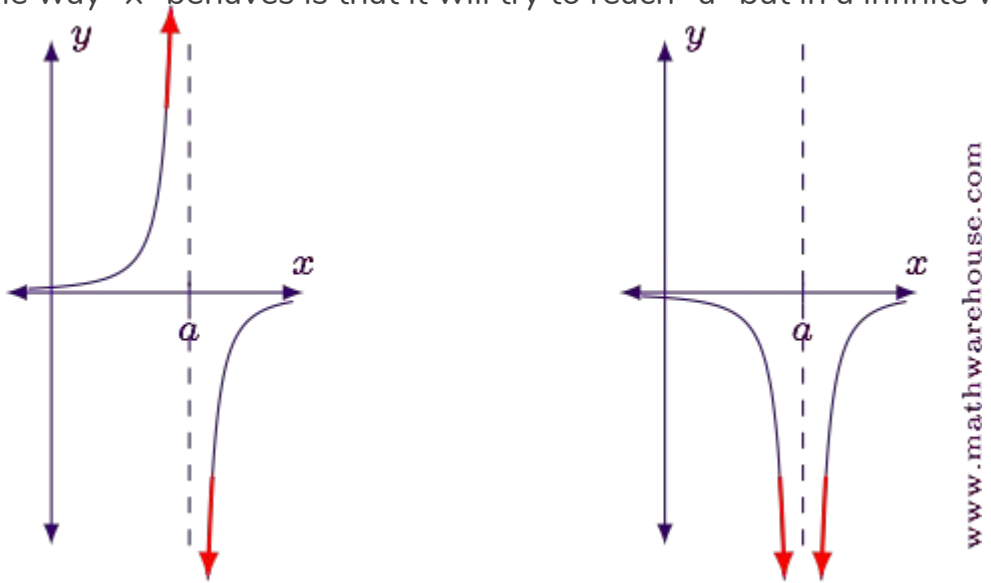
Happens when the limits of a function from the left and right side are infinite

These limits can be one positive and one negative; both positive; or both negative



Example

Both graphs doesn't have a definite value, making their limit nonexistent, makes it an infinite discontinuity. The way "x" behaves is that it will try to reach "a" but in a infinite way.

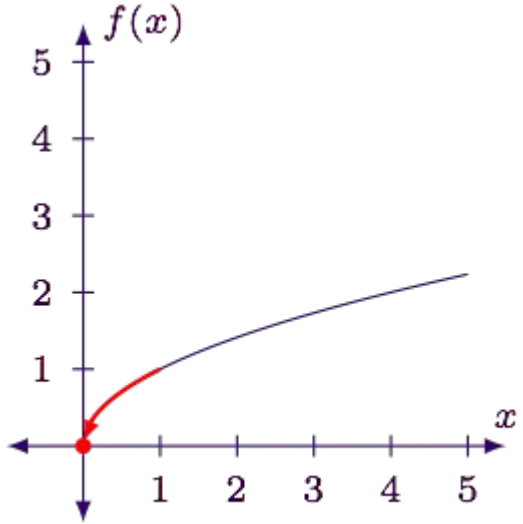


Other Examples of Infinite Discontinuities

Endpoint discontinuity

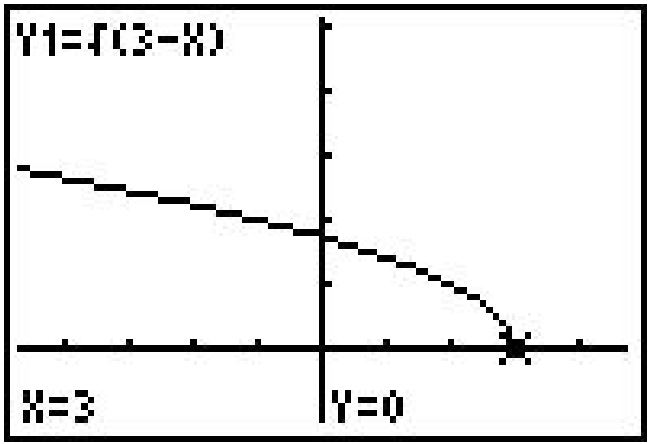
Whenever the limit is defined in an interval with a closed endpoint

The limit examines the functions as x approaches
from both sides, so the limit cannot exist at the endpoint.



Example

Limits on this graphs doesn't exist, its endpoint makes it to doesn't have any jumps or holes. It is characterized when "x" is commonly 0 and when it can't go on both sides.



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