Definition of Continuity of a Function at a Point.
f(x) is continuous at x = c iff all 3 of the following are true.

1. f(c) is defined
2. $\lim_{x \to c} f(x)$ exists
3. $\lim_{x \to c} f(x) = f(c)$

Function f(x) has a Removable Discontinuity at x = a if by re-defining the function at a, it is possible to make the function continuous at x = a.

All other discontinuities are Non-Removable Discontinuities.

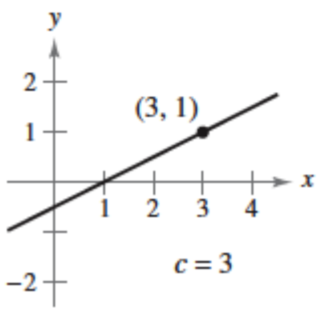
Types of Non-Removable Discontinuities include vertical asymptotes and Jump Discontinuities.

See the graphs on Page 78 #'s 1-6 and Discuss the Continuity of the Functions.

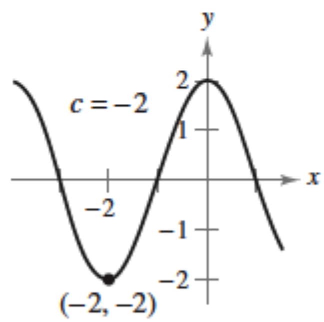
In Exercises 1–6, use the graph to determine the limit, and discuss the continuity of the function.

(a) $\lim_{x \to c^+} f(x)$ **(b)** $\lim_{x \to c^-} f(x)$ **(c)** $\lim_{x \to c} f(x)$

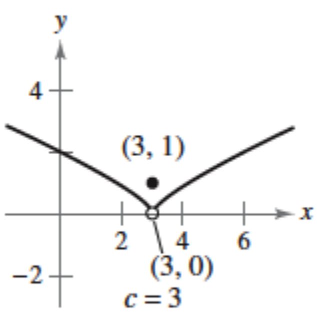
1.



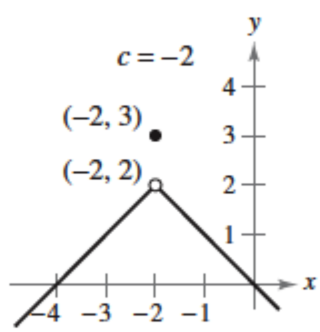
2.



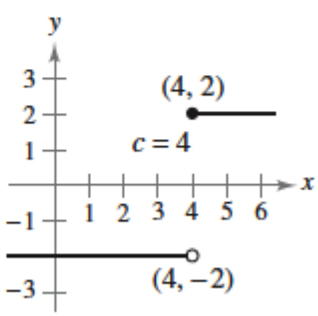
3.



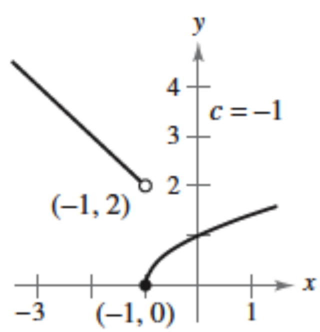
4.



5.



6.



The Following Functions are Continuous at every point <u>in their domain</u>:

1. Polynomial Functions
2. Rational Functions
3. Radical Functions
4. Trigonometric Functions

Intermediate Value Theorem:
If f is continuous on the closed interval [a, b] and k is any number between f(a) and f(b), then there is at least one number c in [a, b] such that f '(c) = k.

Assignment 103:
Continuity and One-Sided Limits
Page 78, #'s 8, 12, 15, 40, 57, 71, 83