

Continuity of a Function

p. 117 - 125 (2.4)

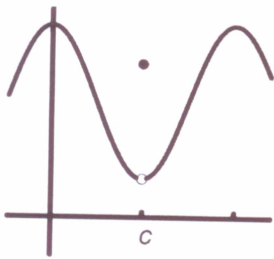
9

A function f is *continuous* at c if:

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

A continuous function is continuous at every point of its domain.

1. State how continuity is destroyed at $x = c$ for the graph below.



$$f(c) \neq \lim_{x \rightarrow c} f(x)$$

- **2. If the function f is continuous and if $f(x) = \frac{x^2 - 4}{x + 2}$ when $x \neq -2$, then $f(-2) = ?$

$$\lim_{x \rightarrow -2} \frac{(x+2)(x-2)}{x+2} = \boxed{-4}$$

3. Let h be defined by the following,

$$h(x) := \begin{cases} 3x - 5 & x \leq -2 \\ -x^4 + 3 & -2 < x < 3 \end{cases}$$

$$\lim_{x \rightarrow -2^-} h(x) = -11$$

$$\lim_{x \rightarrow -2^+} h(x) = -13$$

For what values of x is h not continuous?

$$x = -2$$