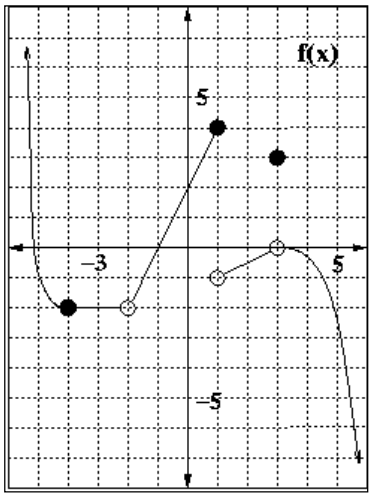
Name: _____

Continuity

Exercise 1: Use the given graph of *f(x)* to answer the questions:



1) Evaluate $\lim_{x\to 1^-} f(x)$

2) Evaluate $\lim_{x\to\infty} f(x)$

3) Evaluate $\lim_{x\to -2} f(x)$

4) For what values of *x* is *f(x)* discontinuous?

Exercise 2: Is the function $f(x)$ continuous at *x = -1*? At *x=1*?

$$f(x)=\begin{cases} x-2, & x<1 \\ \sqrt{x}, & x\geq 1 \end{cases}$$

Exercise 3: Use the definition of continuity to show that the function is continuous at the given number.

$$f(x)=\frac{x+1}{x^2+2}, \qquad x=1$$

Exercise 4: Explain why the function is not continuous at the given number.

1) $f(x)=\dfrac{5}{(x-2)^2}$, $x=2$

2) $f(x)=\dfrac{x^2+6x+8}{x^2-x-2}$, $x=2$

3) $f(x)=\begin{cases} x^3, x\neq 1 \\ 5, x=1 \end{cases}$, $x=1$

4) $f(x)=\begin{cases} 1+x^2, x\leq 1 \\ x-3, x>1 \end{cases}$; $x=1$