Name: _____

Continuity

1) Discuss the continuity of each of the following functions.

a) $f(x)=\dfrac{x^2-3x+2}{x-1}$

b) $f(x)=\begin{cases}2x-1, & x\le 2\\ x^2+3, & x>2\end{cases}$

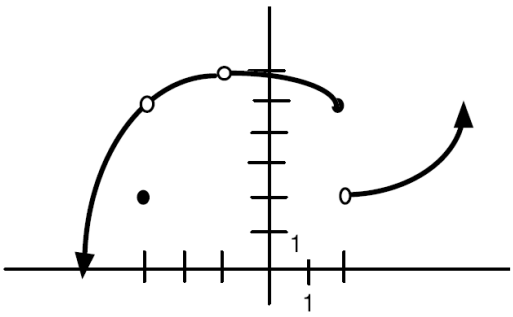
2) Determine the value of c such that the function is continuous on the entire real line.

$$f(x)=\begin{cases}x+3, & x\le 4\\ cx+6, & x>4\end{cases}$$

3) Find the constant *a* such that the function *f* is continuous on the entire real line if

$$f(x)=\begin{cases}\dfrac{4\sin x}{x} & ,x<0\\ a-2x & ,\ x\ge 0\end{cases}$$

4) A) For the function f graphed below, find the indicated limit or function value, or state the limit does not exist.



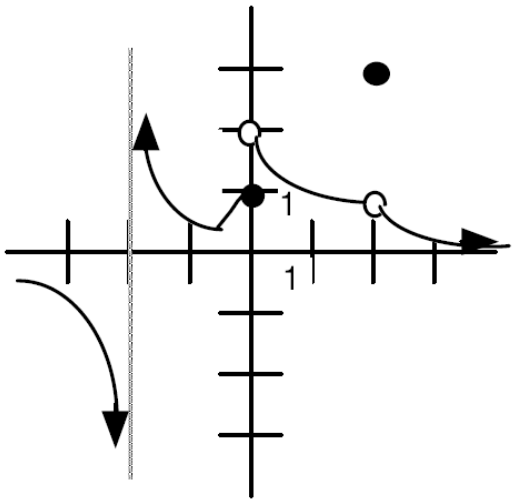
1) $\lim\limits_{x\to -3} f(x)$
2) $\lim\limits_{x\to -1} f(x)$
3) $\lim\limits_{x\to 2} f(x)$
4) $f(-3)$
5) $f(-1)$
6) $f(1)$
7) $f(2)$

B) Is the function continuous at x=2?

C) Is the function continuous at x=-3?

D) Is the function continuous at x=-1?

5) Study the graph below and determine where the function is discontinuous. Identify the removable discontinuities and define the value of the function in order to remove the discontinuity.



6) Prove that each of the following functions is continuous at the given value, using the three part definition of continuity at a point *c*.

1) $f(x) = x - 2$ at c=3
2) $f(x) = \sqrt{x}$ at c=4
3) $f(x) = x - \frac{1}{x}$ at c=1
4) $f(x) = x^2$ at c=-1

7) Prove that each of the following is discontinuous at the given value

1) $f(x) = 1 - \frac{1}{x}$ at c=0

2) $f(x) = \frac{x^2 - 4}{x-2}$ at c=2

3) $f(x) = \begin{cases} x - 2 & \text{if } x > 2 \\ x^2 & \text{if } x \le 2 \end{cases}$ at c=0