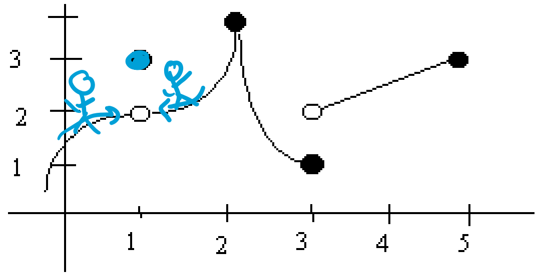
1. Below is a graph of the function f(x).



Using the definition of continuity, explain if *f* is continuous at *x* = 1.

$f(1) = 3$

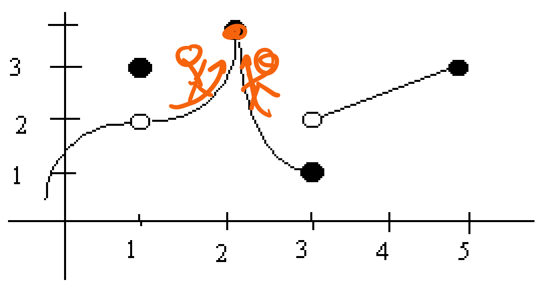
$\lim_{x\to1^-} f(x) = \lim_{x\to1^+} f(x)$

$2 = 2$ $\therefore \lim_{x\to1} f(x) = 2$

f is not cont @ $x=1$ b/c $f(1) \neq \lim_{x\to1} f(x)$

$3 \neq 2$ ...

2. Below is a graph of the function f(x).



Using the definition of continuity, explain if *f* is continuous at *x* = 2.

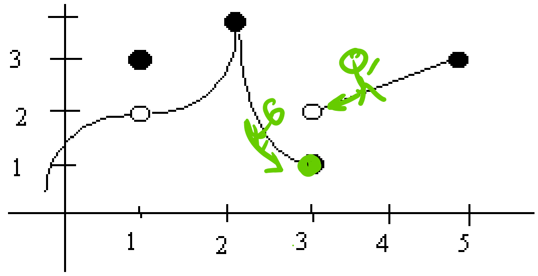
$f(2) = 4$

$\lim_{x\to2^-} f(x) = \lim_{x\to2^+} f(x)$

$4 = 4$ $\therefore \lim_{x\to2} f(x) = 4$

f is cont @ $x=2$ b/c $f(2) = \lim_{x\to2} f(x)$

3. Below is a graph of the function f(x).



Using the definition of continuity, explain if *f* is continuous at *x* = 3.

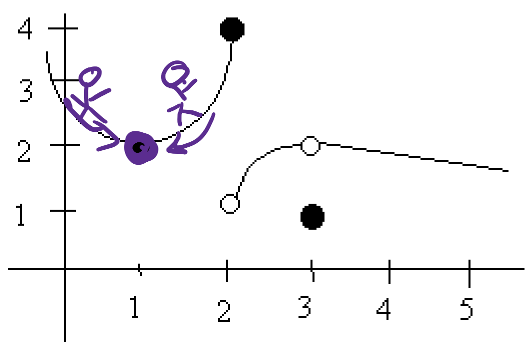
$f(3)=1$

$\lim_{x\to 3^-} f(x) \neq \lim_{x\to 3^+} f(x)$

$1 \neq 2$ $\therefore$, $\lim_{x\to 3} f(x)$ DNE

f is not cont @ $x=3$ b/c $\lim_{x\to 3} f(x)$ DNE.

4. Below is a graph of the function *g*(x).



Using the definition of continuity, explain if *g* is continuous at *x* = 1.

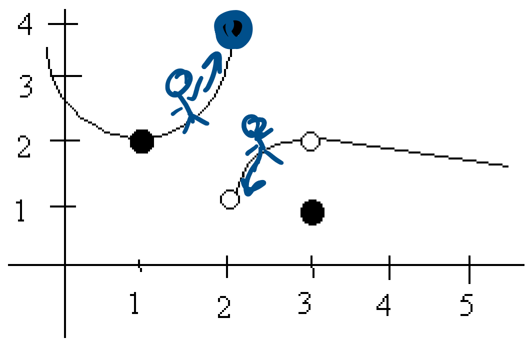
$g(1)=2$

$\lim_{x\to 1^-} g(x) = \lim_{x\to 1^+} g(x)$

$2=2$ $\therefore$, $\lim_{x\to 1} g(x)=2$

f is cont @ $x=1$ b/c $f(1)=\lim_{x\to 1} g(x)$

5. Below is a graph of the function g(x).



Using the definition of continuity, explain if g is continuous at x = 2.

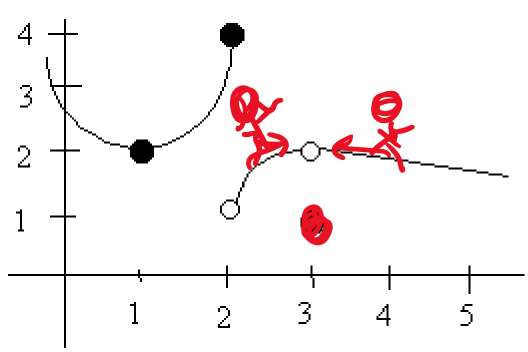
$g(2) = 4$

$\lim_{x\to 2^-} g(x) \neq \lim_{x\to 2^+} g(x)$

$4 \neq 1$ $\therefore \lim_{x\to 2} g(x)$ DNE

g is <u>not</u> cont @ $x = 2$ b/c $\lim_{x\to 2} g(x)$ DNE.

6. Below is a graph of the function g(x).



Using the definition of continuity, explain if g is continuous at x = 3.

$g(3) = 1$

$\lim_{x\to 3^-} g(x) = \lim_{x\to 3^+} g(x)$

$2 = 2$ $\therefore, \lim_{x\to 3} g(x) = 2$

g is <u>not</u> cont @ $x = 3$ b/c $g(3) \neq \lim_{x\to 3} g(x)$

$1 \neq 2$

7. Let *f* be the function defined by

$$f(x) = \begin{cases} \frac{1}{2}x + 1 & x \leq 2 \\ 3 - x & x > 2 \end{cases}$$

Is *f* continuous at x = 2? Use the definition of continuity to explain your answer.

$f(2) = \frac{1}{2}(2) + 1$
$= 1 + 1$
$= 2$

$\lim_{x \to 2^-} f(x) \neq \lim_{x \to 2^+} f(x)$

$\lim_{x \to 2^-} \left(\frac{1}{2}x + 1\right) \neq \lim_{x \to 2^+} (3 - x)$

$\frac{1}{2}(2) + 1 \neq 3 - 2$

$2 \neq 1$

$\therefore, \lim_{x \to 2} f(x)$ DNE

f is not cont @ x = 2 b/c $\lim_{x \to 2} f(x)$ DNE

8. Let *g* be the function defined by

$$g(x) = \begin{cases} -2x + 3 & x < 1 \\ 5 & x = 1 \\ x^2 & x > 1 \end{cases}$$

Is *g* continuous at x = 1? Use the definition of continuity to explain your answer.

$g(1) = 5$

$\lim_{x \to 1^-} g(x) = \lim_{x \to 1^+} g(x)$

$\lim_{x \to 1^-} (-2x + 3) = \lim_{x \to 1^+} x^2$

$-2(1) + 3 = 1^2$

$1 = 1$

$\therefore, \lim_{x \to 1} g(x) = 1$

g is not cont @ x = 1 b/c $g(1) \neq \lim_{x \to 1} g(x)$

$(5 \neq 1)$ ... ☺