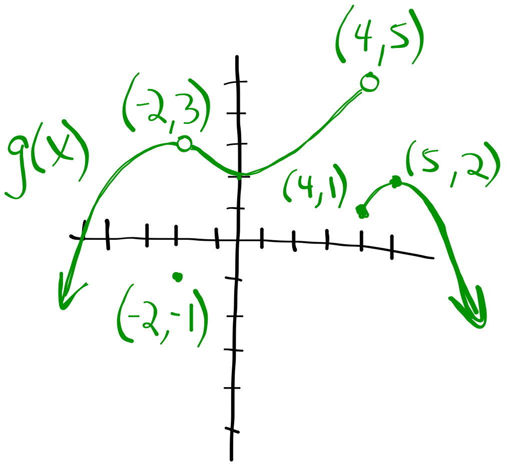
Limits

Consider the function shown below.



① $\lim_{x\to 4^-} g(x) = 5$

$\lim_{x\to 4^+} g(x) = 1$

$\lim_{x\to 4} g(x)$ DNE

$g(4) = 1$

② $\lim_{x\to 5} g(x) = 2$

$g(5) = 2$

③ $\lim_{x\to -2} g(x) = 3$

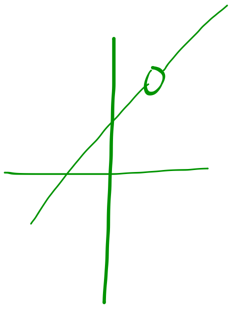
$g(-2) = -1$

A function is continuous iff $\lim_{x\to c^-} f(x) = \lim_{x\to c^+} f(x) = f(c)$

ex) $\lim\limits_{x \to 3} \dfrac{x^2+1}{x} = \dfrac{3^2+1}{3} = \dfrac{10}{3}$

Continuous everywhere except 0.

ex) $\lim\limits_{x \to 2} \dfrac{x^2-4}{x-2} = \lim\limits_{x \to 2} (x+2) = 4$



P.O.D. (2,4)

$x \neq 2$ $\quad \dfrac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}}$

ex) $\lim\limits_{x \to 3} \dfrac{x+2}{x-3}$ DNE $x \neq 3$ VA: $x=3$

ex) $\lim\limits_{x \to 2} \dfrac{e^{x-2}-1}{x-2}$ $\qquad \dfrac{e^{2-2}-1}{2-2} = \dfrac{0}{0}$?

Use "numerical approach" where you try values close to the value you are approaching.

try $x = 1.9999$ $\quad f(1.9999) = 0.99995000\ldots$

$x = 2.00001$ $\quad f(2.0001) = 1.00005000\ldots$

Guess? $\lim\limits_{x \to 2} f(x) = 1$

pg. 62-63
#1-16 (omit 12)
#17-20
#31, 32

P.O.D. (2,1)