

Def. The limit of $f(x)$ as x approaches a , ^{from the right} written

$$\lim_{x \rightarrow a^+} f(x) = L, \text{ or } f(x) \rightarrow L \text{ as } x \rightarrow a^+$$

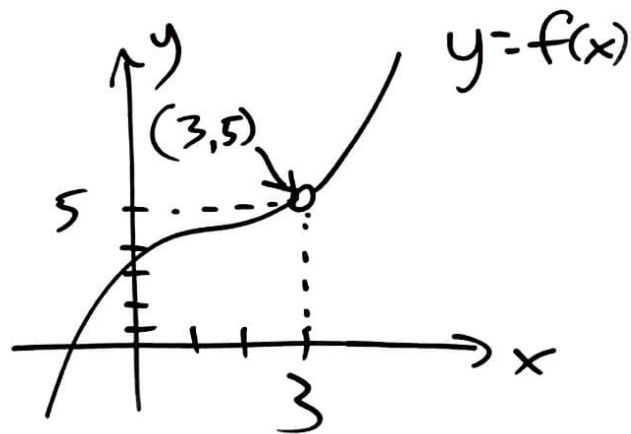
is the number L such that $f(x)$ is arbitrarily close to L , whenever x is sufficient close to a (on both sides), but not necessarily equal to a .
(and greater than a).

$f(a)$ might be undefined

Note: If there no such L , we say the limit does NOT exist

$f(a) = L$ is allowed
$f(a) \neq L$ is allowed.

examples:

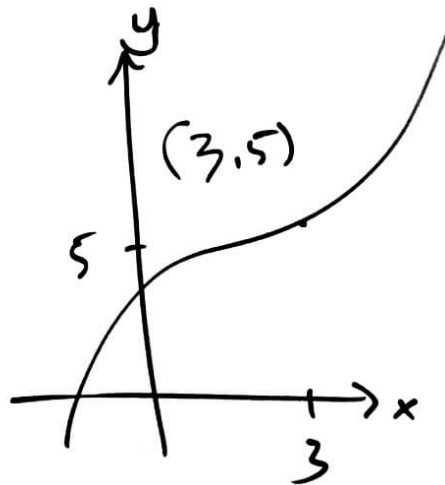


$$\lim_{x \rightarrow 3} f(x) = 5$$

$f(3)$ is undefined

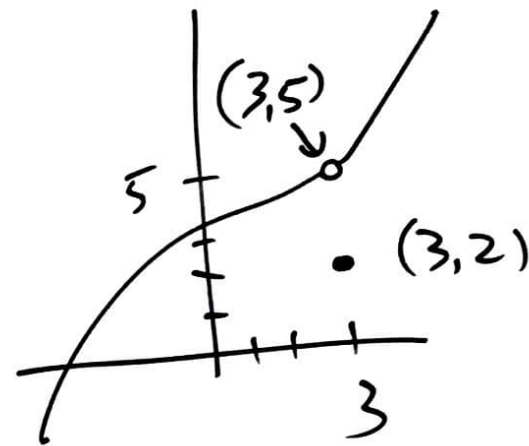
$$\lim_{x \rightarrow 3^+} f(x) = 5, \quad \lim_{x \rightarrow 3^-} f(x) = 5$$

We say f is continuous at 3.



$$\lim_{x \rightarrow 3} f(x) = 5$$

$$f(3) = 5$$



$$\lim_{x \rightarrow 3} f(x) = 5$$

$$f(3) = 2.$$