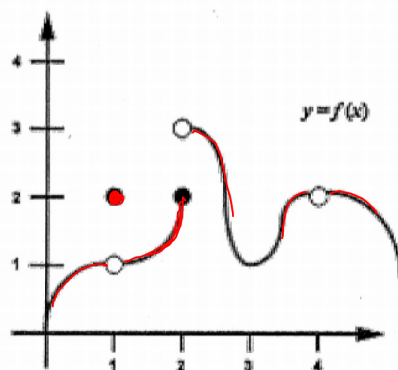


# One-sided Limits examples.notebook

## Example

Using the graph below, find the values (if they exist) of:

1.  $\lim_{x \rightarrow 1^-} f(x) = 1$
2.  $\lim_{x \rightarrow 1^+} f(x) = 2$
3.  $\lim_{x \rightarrow 1} f(x) = \text{does not exist}$
4.  $f(1) = 2$
5.  $\lim_{x \rightarrow 2^-} f(x) = 2$
6.  $\lim_{x \rightarrow 2^+} f(x) = 3$
7.  $\lim_{x \rightarrow 2} f(x) = \text{does not exist}$
8.  $\lim_{x \rightarrow 4} f(x) = 2$
9.  $f(4) = \text{does not exist}$



## One-sided Limits examples.notebook

### Example

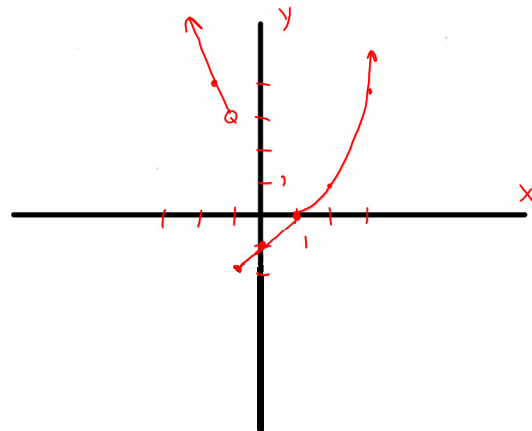
Sketch the following piecewise defined function and use it to determine the values for which  $\lim_{x \rightarrow a} f(x)$  exists.

$$f(x) = \begin{cases} 2 - x & \text{if } x < -1 \\ x - 1 & \text{if } -1 \leq x < 1 \\ (x - 1)^2 & \text{if } x \geq 1 \end{cases}$$

$$f(x) = -x + 2 \quad \text{less than } -1$$

$$f(x) = x - 1 \quad \text{between } -1 \text{ and } 1$$

$$f(x) = (x - 1)^2 \quad \text{greater than } 1$$



The  $\lim_{x \rightarrow a} f(x)$  exists for all real values <sup>of "a"</sup> other than  $-1$