

Answer on Question #45110 –Math - Calculus

Task:

Find the indicated limit, if it exists.

limit of f of x as x approaches negative 10 where f of x equals negative 4 minus x when x is less than negative 10, 6 when x equals negative 10, and x plus 16 when x is greater than negative 10

Solution:

$$f(x) = \begin{cases} -4 - x, & \text{if } x < -10 \\ 6, & \text{if } x = -10 \\ x + 16, & \text{if } x > -10 \end{cases}$$

We will find left-handed and right-handed limits and if they are equal than the limit of f of x exists.

So, left-hand limit is equal to $\lim_{x \rightarrow -10^-} f(x) = \lim_{x \rightarrow -10^-} (-4 - x) = -4 - (-10) = 6$

The right-hand limit is equal to $\lim_{x \rightarrow -10^+} f(x) = \lim_{x \rightarrow -10^+} (x + 16) = -10 + 16 = 6$.

And $f(-10) = 6$.

So, both (left-hand and right-hand) limits are equal, hence the limit exists and it is equal to 6.

Answer: 6.