

Answer on Question #42568, Math, Calculus

Problem.

Find the indicated limit, if it exists.

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

- a. 6
- b. 0
- c. 16
- d. The limit does not exist

Solution.

Let us consider one-sided limits. If both of these limits are equal to a , then $\lim_{x \rightarrow -10} f(x) = a$.

$$\lim_{x \rightarrow -10-} f(x) = \lim_{x \rightarrow -10-} (-4 - x) = -4 - (-10) = 6.$$

$$\lim_{x \rightarrow -10+} f(x) = \lim_{x \rightarrow -10+} (x + 16) = -10 + 16 = 6.$$

$$\text{So, } \lim_{x \rightarrow -10-} f(x) = \lim_{x \rightarrow -10+} f(x) = \lim_{x \rightarrow -10} f(x) = 6.$$

Answer: 6.