Answer on Question #45112 – Math - Calculus

Find the indicated limit, if it exists.

limit of f of x as x approaches 8 where f of x equals x plus 10 when x is less than 8 and f of x equals 10 minus x when x is greater than or equal to 8

Answer.

$$f(x)=\begin{cases} x+10, & x<8 \\ 10-x, & x\geq 8 \end{cases}$$

Limit of $f(x)$ as x approaches 8 to the left $\lim\limits_{x\to 8^-} f(x)=8+10=18$.

Limit of $f(x)$ as x approaches 8 to the right $\lim\limits_{x\to 8^+} f(x)=10-8=2$.

We must say that the two-sided limit $\lim\limits_{x\to 8} f(x)$ does not exist, because two one-sided limits of $f(x)$ differ when x approaches 8 (to the left or to the right).