

### Answer on Question #53838 – Math – Calculus

limit of  $f$  of  $x$  as  $x$  approaches 1 where  $f$  of  $x$  equals  $1 - x$  when  $x$  is less than 1, 8 when  $x$  equals 1, and  $x + 7$  when  $x$  is greater than 1

Find  $\lim_{x \rightarrow 1} f(x)$ , where

$$f(x) = \begin{cases} 1 - x, & x < 1 \\ 8, & x = 1 \\ x + 7, & x > 1 \end{cases}$$

#### Solution

$$\lim_{x \rightarrow 1^-} f(x) = \lim_{x \rightarrow 1^-} (1 - x) = 1 - 1 = 0$$

$$\lim_{x \rightarrow 1^+} f(x) = \lim_{x \rightarrow 1^+} (x + 7) = 1 + 7 = 8$$

Because  $\lim_{x \rightarrow 1^-} f(x) \neq \lim_{x \rightarrow 1^+} f(x)$ , by definition of the limit,  $\lim_{x \rightarrow 1} f(x)$  does not exist.

**Answer:**  $\lim_{x \rightarrow 1} f(x)$  does not exist.