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a) $f(x) = x$
 $\lim_{x \rightarrow 5} f(x) = \frac{0}{0}$

| $f(x)$ | $x - \delta$ | $a - \delta$ | $a + \delta$ | $f(x)$ |
|-------------------------|--------------|--------------|--------------|--------------|
| $\delta = 0.1$ | 4.9 | 4.9 | 5.1 | 4.9 |
| $\delta = 0.01$ | 4.99 | 4.99 | 5.01 | 4.99 |
| $\delta = 0.001$ | 4.999 | 4.999 | 5.001 | 4.999 |
| $\delta = 0.0001$ | 4.9999 | 4.9999 | 5.0001 | 4.9999 |
| $\delta = 0.00001$ | 4.99999 | 4.99999 | 5.00001 | 4.99999 |
| $\delta = 0.000001$ | 4.999999 | 4.999999 | 5.000001 | 4.999999 |
| $\delta = 0.0000001$ | 4.9999999 | 4.9999999 | 5.0000001 | 4.9999999 |
| $\delta = 0.00000001$ | 4.99999999 | 4.99999999 | 5.00000001 | 4.99999999 |
| $\delta = 0.000000001$ | 4.999999999 | 4.999999999 | 5.000000001 | 4.999999999 |
| $\delta = 0.0000000001$ | 4.9999999999 | 4.9999999999 | 5.0000000001 | 4.9999999999 |

The limit exists.

b) $\lim_{x \rightarrow 3} \frac{3-x}{|3-x|}$
 $x = 3 + \delta$
 $\lim_{x \rightarrow 3} \frac{3-(3+\delta)}{|3-(3+\delta)|} = \frac{3-3-\delta}{|3-3-\delta|} = \frac{-\delta}{\delta} = -1$

a) $\lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$
 $\Rightarrow \frac{3-3}{|3-3|} = \frac{0}{0}$
 The limit does not exist (undefined).

b) $f(x) = \sqrt{x-4}$ $[4 < x < 8]$

| x | $f(x)$ |
|-----|--------|
| 4 | 0 |
| 5 | 1 |
| 6 | 1.4 |
| 7 | 1.7 |
| 8 | 2 |