

2.6.41 Find the limit: $\lim_{x \rightarrow -8^+} \left(\frac{2x}{x+8} \right)$. Justify.

Solution

Well, $\frac{2x}{x+8} = \frac{p(x)}{q(x)}$ is a rational

function and $\lim_{x \rightarrow -8^+} p(x) = \lim_{x \rightarrow -8^+} (2x) = 2(-8) = -16 \neq 0$

and $\lim_{x \rightarrow -8^+} q(x) = \lim_{x \rightarrow -8^+} (x+8) = (-8)+8 = 0$.

(Notice, p and q are polynomials and we have used Theorem 2.2 here.)

So, Dr. Pabi's definite limit theorem implies that the given limit is either $+\infty$ or $-\infty$. So we make

THINKING



a "SIGN DIAGRAM" for $\frac{2x}{x+8}$ as $x \rightarrow -8^+$.

We have $\frac{2x}{x+8} \Rightarrow \frac{(-)}{(+)} = -$

So $\lim_{x \rightarrow -8^+} \left(\frac{2x}{x+8} \right) = -\infty$. \square

x is
LIKE
-7.9