

Question 9

Evaluate the limit:

$$\lim_{x \rightarrow 0^-} \frac{2x + 1}{x}$$

Question 9 - Solution

We are asked to evaluate:

$$\lim_{x \rightarrow 0^-} \frac{2x + 1}{x}$$

Step 1: Behavior near zero from the left

As $x \rightarrow 0^-$, the numerator $2x + 1 \rightarrow 1$, since $2x \rightarrow 0^-$ and 1 is a constant.

The denominator $x \rightarrow 0^-$, which is a small negative number.

So the entire fraction behaves like:

$$\frac{2x + 1}{x} \approx \frac{1}{\text{tiny negative}} = -\infty$$

Step 2: More formal analysis (optional)

We can write:

$$\frac{2x + 1}{x} = 2 + \frac{1}{x}$$

As $x \rightarrow 0^-$, $\frac{1}{x} \rightarrow -\infty$, and the constant 2 becomes negligible in comparison.

Conclusion:

$\lim_{x \rightarrow 0^-} \frac{2x + 1}{x} = -\infty$
