

Question 3

Evaluate the following limit:

$$\lim_{x \rightarrow 3^-} \frac{1}{(x-3)^2}$$

Question 3 - Solution

We are given:

$$\lim_{x \rightarrow 3^-} \frac{1}{(x-3)^2}$$

Step 1: Analyze the behavior of the denominator

As $x \rightarrow 3^-$, we are approaching 3 from the left. The expression $x - 3$ becomes a small negative number. But since it is squared:

$$(x-3)^2 \rightarrow 0^+ \quad (\text{very small positive number})$$

Step 2: Behavior of the function

Since we are dividing by a very small positive number, the entire expression becomes very large:

$$\frac{1}{(x-3)^2} \rightarrow +\infty$$

Conclusion:

$$\boxed{\lim_{x \rightarrow 3^-} \frac{1}{(x-3)^2} = \infty}$$