

Question 5

Evaluate the following limit:

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

Question 5 - Solution

We are given:

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

Step 1: Analyze the expression

As $x \rightarrow 0^-$, x is approaching 0 from the left. So x is negative, but very close to 0. Now, consider the square of x :

$$x^2 > 0 \text{ for all } x \neq 0$$

Even though x is negative, x^2 is positive. As $x \rightarrow 0^-$, $x^2 \rightarrow 0^+$

Step 2: Behavior of the expression

$$\frac{1}{x^2} \rightarrow \frac{1}{\text{small positive number}} \rightarrow \infty$$

Conclusion:

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