

Question 6

Evaluate the limit:

$$\lim_{x \rightarrow \infty} \frac{3x^5 - 2x^2 + 1}{x^5 + 4x^3 - x}$$

Question 6 - Solution

We are given:

$$\lim_{x \rightarrow \infty} \frac{3x^5 - 2x^2 + 1}{x^5 + 4x^3 - x}$$

Step 1: Divide numerator and denominator by the highest power of x , which is x^5 :

$$= \lim_{x \rightarrow \infty} \frac{3 - \frac{2}{x^3} + \frac{1}{x^5}}{1 + \frac{4}{x^2} - \frac{1}{x^4}}$$

Step 2: As $x \rightarrow \infty$, all terms with negative powers of x go to zero:

$$= \frac{3 - 0 + 0}{1 + 0 - 0} = \boxed{3}$$