

Question 5

Evaluate the limit:

$$\lim_{x \rightarrow \infty} \frac{\ln x}{\sqrt{x}}$$

Question 5 - Solution

As $x \rightarrow \infty$, both numerator and denominator approach infinity:

$$\frac{\ln x}{\sqrt{x}} \rightarrow \frac{\infty}{\infty} \quad (\text{indeterminate form})$$

Apply L'Hospital's Rule:

$$\lim_{x \rightarrow \infty} \frac{\ln x}{\sqrt{x}} = \lim_{x \rightarrow \infty} \frac{\frac{d}{dx} \ln x}{\frac{d}{dx} \sqrt{x}} = \lim_{x \rightarrow \infty} \frac{\frac{1}{x}}{\frac{1}{2\sqrt{x}}} = \lim_{x \rightarrow \infty} \frac{2\sqrt{x}}{x} = \lim_{x \rightarrow \infty} \frac{2}{\sqrt{x}} = 0$$

Final Answer:

$$\boxed{0}$$