

Illustration 39 Evaluate $\lim_{x \rightarrow \infty} e^x \sin(d/e^x)$.

Solution. When $x \rightarrow \infty$, $e^x \rightarrow \infty$

But, angle of sine = $\frac{d}{e^x} = \frac{\text{finite}}{\infty} = 0$

$$\begin{aligned} \therefore \text{The given limit} &= \lim_{x \rightarrow \infty} \frac{\sin(d/e^x)}{1/e^x} \\ &= \lim_{x \rightarrow \infty} \frac{\sin d/e^x}{d/e^x} \times d = 1 \times d = d \end{aligned}$$