Find \( \lim_{x \to -2} \frac{x - 2}{(x + 2)^2} \)

\[
\text{Solution: } \lim_{x \to -2} \frac{x - 2}{(x + 2)^2} = \frac{-4}{0} = -\infty.
\]

When \( x \) approaches \(-2\) from both left & right, the bottom will be a very small positive number, but the top is \(-4\), so the limit is \(-\infty\).

You can find this by a table or the below graph:

\( (\overline{over}) \)
2) Find \( \lim_{{x \to \infty}} e^{-x} \cdot \sin(x) \)

**Solution:**

We can do this problem by squeeze theorem:

\( e^x \) is always positive,

\[-1 \leq \sin(x) \leq 1\]

\[\therefore -e^{-x} \leq e^{-x} \sin(x) \leq e^{-x}\]

\[
\begin{align*}
\lim_{{x \to \infty}} e^{-x} &= 0, \\
\lim_{{x \to \infty}} -e^{-x} &= 0 \\
\therefore \lim_{{x \to \infty}} e^{-x} \cdot \sin(x) &= 0
\end{align*}
\]

(*) Although you can do it by calculating a table, we prefer this method.