

Problem 1

Find $\lim_{x \rightarrow 1^+} \frac{\sqrt{2x}(x-1)}{|x-1|}$ and $\lim_{x \rightarrow 1^-} \frac{\sqrt{2x}(x-1)}{|x-1|}$ (note: not a typo).

Problem 2

Find $\lim_{x \rightarrow -\infty} \sqrt{x^2 - x} - \sqrt{x^2 + x}$.

Problem 3

Find $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2 + 1} + 1}{\sqrt{x^2 + x} + x}$

Problem 4

Find $\lim_{x \rightarrow \frac{\pi}{2}^+} \frac{1}{\cos(x)}$

Problem 5

Show that the function $f(x) = \frac{x^2 - 4}{x^3 - x}$ has a horizontal asymptote at $y = 0$ and three vertical asymptotes at $x = 0$, $x = 1$ and $x = -1$.